Volume 5 August, 1926 Number 8

JOURNAL

OF THE

AMERICAN WELDING SOCIETY

YEAR BOOK

Published Monthly by the American Welding Society
33 West Thirty-ninth Street, New York

American Welding Society

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JOURNAL

OF THE

AMERICAN WELDING SOCIETY

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AMERICAN WELDING SOCIETY
ESTABLISHED 1919
JOURNAL

Volume 5 August, 1926 Number 8

American Welding Society

Purposes and Functions:

The functions of the American Welding Society are:

a. To disseminate reliable information on welding, including proper technique, suitable materials, best methods to be used, cost data, new applications, technical data, service results and training of operators.

b. To provide an organization for the promulgation of standards in the welding field.

c. To bring about the extension of the use of welding through research work, dissemination of information and proper regulatory codes.

Principal Departments of the Society

The work of the Society is carried on through a number of channels, the most important of which are local sections, publications, national meetings, research department (American Bureau of Welding) committees, and information service.

Sections of the Society

Sections of the American Welding Society are now organized in a number of large cities (see page 2); others will be formed in the various industrial centers throughout the country to assist in promoting the work of the Society. Regular monthly meetings are held in each section at which papers and lectures of general interest are presented.

Section meetings provide a very valuable medium for the Society to carry out its functions. It is true that important papers are published in the Journal, nevertheless meetings allow the author to personally present his material, to illustrate important points by lantern slides, diagrams, exhibits, demonstrations and moving pictures. Moreover, they afford an opportunity for discussion. Contentions by authors can many times be expanded and improved as the result of the combined wisdom and experience of other members present.

Aside from the obvious advantages there are reasons which are sometimes overlooked but which are very important. Meetings of this sort provide an opportunity for association with others in

the same field and discussion of problems which are of mutual interest. This results often in the obtaining of new ideas and suggestions and creates good fellowship. We must depend upon section meetings for the creation of enthusiasm in the work of the Society and in welding itself. The effect of this enthusiasm in bringing about the extension of the use of welding is not always tangible, but, nevertheless, is productive of valuable results.

Publications

The principal publication of the Society is its monthly Journal which is distributed free to all members. This publication was started in January, 1922. In it are included papers giving accurate information on the application of welding in a wide variety of fields. A large number of research committee reports are also included.

Important papers presented before national and section meetings are published regularly. In addition to these technical papers there are included news items of section activities, actions taken by the Society through its various committees, officers and Board of Directors, statement of financial affairs of the Society, an employment service bulletin, a review of current welding literature, technical question and answer column and an advertising section. Beginning with the year (1924) there was published a membership directory as the August issue of the Journal. This directory includes full information concerning Society activities, the names and addresses of all members, a list of the companies who are supporting the Society through Class A members and finally, the advertising section. This directory may really be considered as a "blue book" of those identified with the welding industry. This year the Directory has been expanded to a Year Book and much additional information incorporated.

In order to provide a permanent record, the Society, at the end of each year, binds a limited number of copies of its Journal in attractive book form, which are sold to members at $5 per volume. The bound volumes contain a subject and author's index. Volumes for the years 1922-3-4-5, are still available.

Aside from the Journal, the Society publishes from time to time bulletins containing reports of its research department, the American Bureau of Welding. Not all of the Bureau reports are published in bulletin form, only those for which there are a sufficient demand as separate documents. These are made available to members at practically the cost of printing.

National Meetings

In addition to the local section meetings there are held each year two general meetings of the Society; the fall meeting in October and the annual meeting in April. The fall meeting is generally held at some section headquarters outside of New York, while the annual meeting is always held at the headquarters of the Society.

The Fall Meeting of 1925 was held in Boston at the Massachusetts Institute of Technology. An outstanding feature of this Fall Meeting was the first welding exhibit staged by the Society. Twenty-five exhibitors demonstrated the new developments in apparatus and materials that have been made during the past few years, enabling prospective users of welding to receive first hand demonstrations of what could be done in the welding and cutting field by the several processes.

Amazement was expressed not only by experts from allied industries, but even by those associated with the welding industry, as to the recent extension of the numerous applications of welding. This phase was stressed particularly in the technical papers. Welding is becoming one of the most important manufacturing means available today and the several processes of welding are fast replacing riveting and castings in hundreds of different industries.

The next fall meeting will be held in Buffalo on November 17, 18 and 19. An International Welding Exposition will be held in conjunction with this meeting which will include not only an exhibition of welding apparatus and supplies, but also of welded products. A very large attendance is expected at this meeting. A number of important symposiums on several phases of the welding industry are scheduled.

The annual meetings of the Society, which occur during the last part of April, are devoted to research committee sessions, business sessions, election of officers, annual reports of committee chairmen, annual meeting of the research department (American Bureau of Welding), Board of Directors' meeting and annual dinner. It has been stated by competent experts that the value of one annual meeting alone is worth the membership dues in the Society several times over.

Research Department—Information Service

The research department of the American Welding Society is known as the American Bureau of Welding. It also acts as the Welding Research Department of the National Research Council.

The purpose of the Bureau is to bring to bear on the solution of welding problems the latest scientific knowledge and the scientific method of attack. To this end, the cooperation of all interested scientific and engineering organizations has been enlisted. It also provides an organization whose reports and pronouncements are accepted the world over as sound and absolutely free from commercial bias.

The work of the Bureau is carried on through research subcommittees which handle specific problems. Members of these committees are interested experts representing both the scientific and practical side and include also business men. In this way there is brought to bear on the solution of complex welding problems the best talent that is available.

In addition to specific research problems the Bureau maintains

a technical information service. During the past year several hundred requests for information have been satisfactorily answered. Where the information is of general interest the questions and answers are published in the Journal of the Society. Through the work of its committees and its information service the Bureau has acquired during the past few years a reputation as an authentic source of welding information that is recognized the world over.

Technical societies in the various fields of engineering have come to recognize the value of specifications and standards. These standards and specifications came about as the result of experience which has shown that a particular method or material is best suited for a particular purpose. Without reliable specifications one would have to depend upon one's own experience or upon the experience of the manufacturer. Many times the user would be unfamiliar with the methods and materials that were best suited for his particular case, while, in turn, the manufacturer would be handicapped by a variety of specifications of individual customers. It would be necessary for the manufacturer to have on hand widely different materials for the same purpose. Quality would be sacrificed and in many instances inferior materials and methods would be used and cost would of necessity be increased because of lack of standardization. In our particular case, without the protection of specifications, confidence in welding would be destroyed and its extension retarded. Fortunately for the welding industry, the American Welding Society and its research department (the American Bureau of Welding) have successfully covered this field in a manner which is acceptable and appreciated by the entire industry.

Scratching the surface of scientific investigation has made it possible to overcome apparently insurmountable obstacles which has resulted in the trebling of the use of welding during the past few years. Moreover, with the work now under way and that to be shortly started, as, for example, the investigations in the structural field, there can be no doubt but that the use of welding will be increased many times during the next few years.

The combined cost of the investigations conducted under the auspices of the Bureau will total several hundred thousands of dollars. Results are made available through publication to all members of the Society. The annual report of the American Bureau of Welding is given elsewhere in this Year Book.

Cooperation with Local Engineering Organizations

Opportunities for a wider field of usefulness on the part of the Sections have developed recently through the formation, in some of the larger centers, of affiliated local organizations. Not only has such local affiliation brought about greater cooperation and unity among engineers—highly desirable objectives—but it has given the welding engineer a higher standing in civic and municipal affairs. It has also saved much duplication of effort and expense and has increased the attendance and interest at meetings.

Headquarters

The Society has its headquarters in the Engineering Societies Building, 25 to 33 West Thirty-Ninth Street, between Fifth and Sixth Avenues, New York, which is easily accessible from all parts of the city, by subway, elevated railway and surface lines. It is convenient to most of the principal hotels, theaters and railway stations, and is the New York headquarters for engineers.

Engineering Societies Building

The Engineering Societies Building was made possible by the gift of $1,050,000 by Andrew Carnegie to the engineers of America as represented by the American Institute of Electrical Engineers, the American Society of Mechanical Engineers and the American Institute of Mining Engineers. The societies purchased the land and provided the remainder of the funds. Each of these

societies appointed three members upon a board of trustees, and this board was subsequently incorporated as the United Engineering Society for the purpose of administering the building and holding title to the property. In August, 1916, the American Society of Civil Engineers was admitted as an additional founder society and now holds with the other three founder societies an equal interest in ownership, occupancy and administration of the building, realizing more fully the purpose of Mr. Carnegie, that the building should be the home and headquarters of the engineering profession of America.

The American Welding Society has its offices on the sixteenth floor. Adjoining are the offices of the Division of Engineering and Industrial Research of the National Research Council, which organization is closely affiliated with the research work of the Society. Many other engineering and scientific organizations beside the founders have their headquarters in the building.

Engineering Societies Library

The library, which comprises the individual libraries of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the American Society of Civil Engineers, and the United Engineering Society, is located on the thirteenth and fourteenth floors of the Engineering Societies Building. It is conducted as a free public reference library and contains over 150,000 volumes. In addition to engineering works it contains the general reference books of the allied sciences such as physics, mathematics and chemistry.

The library is open to the public from 9 a. m. to 10 p. m. on all week days except holidays throughout the year, and excepting during July and August, when the hours are 9 a. m. to 6 p. m.

Employment Service

In order to assist its members, the Society maintains an employment service bulletin, which is published regularly in the monthly journal. This service is free to those seeking positions and also to employers seeking welding talent. Members desiring to insert announcements in this bulletin should send same to the Society headquarters to reach the office not later than the 30th of the month for publication in the following issue of the Society.

Classes of Membership

There are several classes of membership in the American Welding Society, as follows:

Class A. Sustaining Members, being individuals or individuals delegated by corporations, firms, partnerships, etc., interested in the science and art of welding, with full rights of membership. Annual dues $100.

Class B. Members, being individuals interested in the science and art of welding, with full rights of membership. Engineers or

individuals competent by experience or training to plan or direct welding operations are eligible to this class. Annual dues, $20.

Class C. Associate members with right to vote but not to hold office, except in sections as may be provided for by the By-Laws of the Sections. Supervising welders, inspectors and skilled operators, with three or more years' practical experience in welding are also eligible to this class. Annual dues, $10.

Class D. Operating members, who are welders or cutters by occupation, without the right to vote or hold office except in Sections as may be provided for by the By-Laws of the Sections. Annual dues, $5 in the United States and Canada; $10 elsewhere.

Class E. Honorary members chosen because of special meritorious achievement in the welding field with no annual dues.

Class F. Student members, who are actually in attendance at any one of the recognized colleges and approved trade schools, without the right to vote or to hold office except in sections as may be provided for by the By-Laws of the Section. Annual dues. $2.50.

The Class A members of the Society are as indicated the supporting members. It is partly through the revenue derived from this source that the Society is able to function. Every company that is financially able to do so as part of its obligation should have at least one Class A member.

The Class B members are really the backbone of the Society. Their dues of $20 are sufficient to pay for their share of the overhead expenses, publication and general activities of the Society. From this class we have our most active members who help administer the affairs of the Society and who contribute largely to the results of its various committees.

The Class C members constitute the balance wheel of practical experience. In this class belong the supervising welders and the skilled operators, who, while not always scientifically trained, nevertheless contribute valuable information from their abundant stock of practical experience. It is with their help that advancement can be made and new ideas put into practical use.

The Class D members are the operators with less than three years of experience. Although their dues barely cover postage, nevertheless it is important that they be members, thereby making it possible for them to keep abreast of all the new developments and the latest authoritative information in the welding field.

How to Become a Member

An application blank for membership in the Society is given elsewhere in this issue in the advertising section. This should be filled in and returned to the Secretary. The application blank is reviewed by the Membership Committee and particular pains is taken by the committee to see that prospective members join under the proper classification. Members are notified of their acceptance and upon payment of dues receive a membership card signed by the Secretary which indicates the class of membership and the expiration date.

Emblem

All members of the Society are privileged to wear the emblem of the Society. Emblems may be purchased from the Secretary's office in the form of pins at $5.00 for the 14 carat solid gold and 75 cents for the gold-filled pins. The pins are finely finished with a dark blue enamed background, and the letters and border in gold.

Management of Society Affairs

As provided in the By-Laws the management of the affairs of the Society is in the hands of a representative Board of Directors, elected by members of the Society in accordance with the By-Laws. A list of the present Board of Directors is given on the inside of the front cover of this Year Book. Inasmuch as it is not possible to hold frequent meetings of such a large body of men, the ordinary affairs of the Society are administered through the President, Secretary and the Executive Committee. The membership of the present Executive Committee of the Society is given below:

EXECUTIVE COMMITTEE

F. M. Farmer, Chairman, Electrical Testing Laboratories.
A. M. Candy, Westinghouse Electric & Mfg. Co.
J. H. Deppeler, Metal & Thermit Corporation.
D. H. Deyoe, General Electric Company.
J. H. Edwards, American Bridge Company.
E. H. Ewertz, Bethlehem Shipbuilding Corporation.
A. S. Kinsey, Air Reduction Sales Company.
C. A. McCune, American Chain Company, Inc.
A. G. Oehler, Simmons Boardman Publishing Company.
E. M. T. Ryder, Third Avenue Railway System.
H. S. Smith, Prest-O-Lite Company.

Meetings and Papers Committee

Article 7, Section 1 (d), of the by-laws of the American Welding Society provides that with the approval of the Board of Directors, the President shall appoint:

"A Meetings and Papers Committee which shall plan and make arrangements for the meetings of the Society. It shall also solicit and pass upon all papers offered for presentation to the Society, and determine which of the papers presented at the Section meetings shall be published in the Proceedings. It shall also have power to edit papers before publication."

MEETINGS AND PAPERS COMMITTEE

P. W. Swain, Chairman, McGraw-Hill Publishing Company.
T. C. Fetherston, Linde Air Products Company.
L. R. Gurley, Railway Mechanical Engineer.
C. J. Holslag, Electric Arc Cutting & Welding Company.
W. R. Hulbert, Metal & Thermit Corporation.
F. E. Rogers, Air Reduction Sales Company.
Wm. Spraragen, Engineering Division, National Research Council.

Rules of Procedure of Meetings and Papers Committee

The Society shall publish and distribute free of charge to its members a monthly publication to be known as the Journal of the American Welding Society. The immediate supervision of the work and the handling of publication details shall rest in the hands

of an Editor who shall, however, at all times be responsible to the Meetings and Papers Committee. In case of doubt as to policy in regard to editorials, advertising and technical papers, the Editor shall call upon the Meetings and Papers Committee except that in case of a disagreement it shall be referred to the Executive Committee of the Society.

The Journal may include editorials, news items, technical reports and papers, employment service bulletin, bibliography of current welding literature, advertising and other items arranged from time to time by the Meetings and Papers Committee.

The Editor of the Journal shall ex-officio be Secretary of the Meetings and Papers Committee.

The Meetings and Papers Committee shall be in charge of the arrangement of the programs for the Annual and Fall meetings of the Society and any other national meetings.

The Meetings and Papers Committee shall assist the local sections in securing suitable programs for their monthly meetings.

The Meetings and Papers Committee may not incur any expense in connection with national meetings or publications unless provided for in the annual budget. The Editor of the Journal shall be required to manage publication costs in such a way that the total for the year shall not vary more than 5 per cent from the allotted budget. Modifications in the budget and other special arrangements may be made upon approval of the Finance and Executive Committees.

All papers presented at section meetings shall be the property of the A. W. S. All sections are requested to send copies of all papers presented at their monthly meetings promptly to the Editor of the Journal. Those papers selected by the Editor (subject to supervision of Meetings and Papers Committee) shall be published in the Journal of the Society. The Editor shall cooperate with trade journals desiring to reprint papers and abstracts of papers. The Meetings and Papers Committee may arrange publication of any paper with trade publications and other journals.

Reports of the American Bureau of Welding, technical and other committees of the Society, selected for publication, shall be published in the Journal. Such reports shall, however, receive the necessary approval of the American Bureau of Welding and the American Welding Society before being released for publication.

Any member of the American Welding Society and others interested in welding shall have the privilege of writing technical papers and submitting them for the consideration of the Meetings and Papers Committee. Papers selected for publication shall be published at the earliest convenient time in the Journal.

Authors submitting papers for publication in the Journal shall not submit them to other publications unless this is clearly indicated in the accompanying letter of transmittal.

The Editor shall advise within 20 days after receipt of papers

whether or not they will be published in the Journal. Failure of such notification will allow the author the privilege of submitting the paper to other publications.

Papers dealing with the results of research investigations, details as to technique and kindred papers will be favored both as to time and space.

Papers presented before joint meetings with other Societies shall be treated as special cases and the rights of cooperating organizations shall be fully recognized.

FINANCIAL REPORT

Auditors' Statement

April 5, 1926.

American Welding Society,
29 West 39th Street,
New York City.

Dear Sirs:

We have examined the Cash for the twelve months ended March 31, 1926.

Attached hereto is a statement of Receipts and Disbursements for the year ended March 31, 1926.

We find that these records are verified by the reports of the Bankers Trust Co. and that the cheques for disbursements are as indicated on the Cash records.

Yours very truly,
(Signed) WM. J. STRUSS & CO.,
Certified Public Accountants.

AMERICAN WELDING SOCIETY

STATEMENT OF RECEIPTS AND DISBURSEMENTS FOR THE YEAR ENDED March 31, 1926

Receipts

Dues	$12,535.96	
Journal Advertising	9,496.50	
Journal Bound Volumes	346.00	
Journal Subscriptions	631.24	
Bulletins	134.76	
Pressure Vessel Reports	120.24	
Reprints	25.46	
Expenses American Bureau of Welding	600.00	
Emblems	15.50	
Committee Refunds	232.81	
Welding Encyclopedias	6.00	
Annual Dinner	525.00	
Refund on Cuts	135.42	
Miscellaneous	2.35	
Bank Interest	128.49	
Return of Loan to Boston Section	250.00	
Total Receipts		$25,185.73
Balance April 1, 1925		6,851.31
		$32,037.04

Disbursements

Salaries	$5,580.00	
Printing Journal	4,951.40	
Editorial Services	1,875.00	
Rent	1,152.00	
Telephone and Telegraph	270.56	
Printing and Stationery	607.80	
Printing (Promotion)	222.94	
Postage	722.22	
Reprints	22.46	
Printing Indexes	85.00	
Printing Directory	350.00	
Binding Journal	81.00	
Equipment	131.50	
Annual and Fall Meetings	1,184.09	
Annual and Fall Dinner	556.50	
Expenses American Bureau of Welding	1,500.00	
Miscellaneous	521.75	
Refunds	27.75	
Section Refunds	3,792.91	
New York Section	409.25	
Loan to Boston Section	250.00	
Total Disbursements		$24,294.13
Balance March 31, 1926		7,742.91
		$32,037.04

Estimated Budget Year Ending

March 31, 1927

INCOME		EXPENSES	
Journal Advertising	$9,984.00	Salaries	$6,120.00
Journal Subscriptions	500.00	Editorial Expenses	2,100.00
Journal Bound Volumes	250.00	Printing Journal	4,800.00
Bulletins	200.00	Binding and Indexing	175.00
Membership dues	14,190.00*	Printing Directory	350.00
	$25,124.00	Room Rental	1,152.00
		Printing and Stationery	1,000.00
		Printing Promotion	500.00
		Telegraph and Telephone	300.00
		Postage	600.00
		Meetings	750.00
		Equipment	500.00
		Miscellaneous	400.00
		Admin. Expenses A. B. of Welding	900.00
		New York Section	500.00
		Sections refund (N. Y. excluded)	4,427.00
		Traveling Expenses	500.00
			$25,074.00

*This figure is based on dues from present members. $1,425 is in delinquent dues, some of which will probably not be collected but will be replaced by new members.

Constitution of the American Welding Society

ARTICLE I

Name

This Society shall be known and designated as the AMERICAN WELDING SOCIETY.

ARTICLE II

Objects

The objects of the Society are:

A—To advance the science and art of welding.

B—To afford its members opportunities for the interchange of ideas with respect to the science and art of welding, and for the publication of information thereon.

C—To conduct research into the science and art of welding, co-operating with other Societies, Associations and Governmental Departments for the benefit of the industry in general.

D—To acquire and dispose of property for the purposes aforesaid.

E—To do all other things incidental or conducive to the attainment of the above named objects, or of any of them.

ARTICLE III

Membership

Individuals, scientific societies, associations or governmental departments interested in welding are eligible for membership in this Society.

ARTICLE IV

Government

The management of the affairs of the Society shall be in the hands of a Board of Directors. The Society for the conduct of its affairs may adopt by-laws, rules and regulations not inconsistent with this Constitution, and may provide methods for amending or repealing such by-laws, rules and regulations different from the method of amending this Constitution.

ARTICLE V

Cooperative Research and Standardization

In order to further its objects most effectively, the Society shall provide for the formation of a separate body to be known by some appropriate title, such as the American Bureau of Welding, or the American Welding Committee, for the purpose of joining with other Societies, Associations and Governmental Departments in cooperative research and standardization in welding.

ARTICLE VI

Amendments

This constitution may be amended by a two-thirds vote of the members voting, expressed orally or in writing, at any annual

meeting of the Society as set forth in the by-laws, provided a notice stating the proposed amendment or amendments with the reasons therefor and any known objections shall have been sent to each member at least two weeks prior to said annual meeting.

By-Laws of the American Welding Society

Adopted March 27, 1919. Amended April 28, 1921, April 14, 1922, January 23, 1924, December 23, 1925.

ARTICLE I

Membership

Section 1. Individuals having received the approval of a majority of the Membership Committee shall become members of this Society upon the payment of dues, except in the case of honorary members, who shall be elected by unanimous vote of the full Board of Directors.

Section 2. Membership shall be divided into seven classes:

Class A—Sustaining Members, being individuals delegated by corporations, firms, partnerships, etc., interested in the science and art of welding, with full rights of membership.

Annual Dues $100.00

Class B—Members, being individuals interested in the science and art of welding, with full rights of membership.

Engineers or individuals competent by experience or training to plan or direct welding operations are eligible to this class.

Annual Dues $20.00

Class C—Associate Members with right to vote but not to hold office, except in sections as may be provided for by the By-Laws of the Sections. Supervising welders, inspectors and skilled operators with three or more years' practical experience in welding are also eligible to this class.

Annual Dues $10.00

Class D—Operating Members, residing in the United States, Canada and Mexico who are welders or cutters by occupation without the right to vote or to hold office excepting in sections as may be provided for by the By-Laws of the Section.

Annual Dues $5.00

Class D—Operating Members, residing outside of the United States, Canada and Mexico, who are welders or cutters by occupation without the right to vote or to hold office.

Annual Dues $10.00

Class E—Honorary Members with full rights of membership. Honorary Members shall be persons of acknowledged eminence in the welding profession, or who may be accredited with exceptional accomplishments in the development of the welding art upon whom the Welding Society may see fit to confer an honorary distinction.

Class F—Student Members, who are actually in attendance at any one of the recognized colleges and approved trade schools, without the right to vote or to hold office except in sections as may be provided for by the By-Laws of the Section.

Annual Dues $2.50

Section 3—Rejection by the Membership Committee of any applicant for membership in the Society shall be subject to review and reversal by the Board of Directors by a two-thirds vote of those present and voting.

ARTICLE II

Dues

Section 1. The Annual Dues shall be as follows:

For Class A members	$100.00
For Class B members	20.00
For Class C members	10.00
For Class D (resident) members	5.00
For Class D (foreign) members	10.00
For Class E members there shall be no annual dues	
For Class F members	2.50

Section 2. All dues shall be payable in advance and shall cover the period of one year from the last day of the month in which a member joins.

Section 3. Funds in excess of those provided by the annual dues which may be needed for research and other work, shall be secured by voluntary subscriptions to be solicited from its members, or from others specially interested.

ARTICLE III

Organization

Section 1. The American Welding Society, in pursuance of the objects set forth in its Constitution, provides for the formation of Sections.

Section 2. Not less than twenty-five individuals eligible to membership (any class) in the Society may apply for authorization for the organization of a section.

Section 3. The American Welding Society will return to each section fifty per cent of all membership fees received from members enrolled in any section except in the case of student members, where the entire fee is to be retained by the Society.

Section 4. The By-Laws of the Section shall not conflict with any provision of the Constitution or By-Laws of the American Welding Society.

ARTICLE IV

Officers, Nominations and Elections

Section 1. The officers of the Society shall be a President, six Vice-Presidents, a Secretary, a Treasurer, and a number of Direc-

tors as hereinafter provided. All officers and directors must be members of the Society.

Section 2. The President shall be elected by the Society for a term of one year, and shall not be eligible for immediate re-election to the same office.

Section 3. A senior Vice-President residing in the vicinity of headquarters shall be elected by the Society for a term of one year. The United States shall be divided into five geographical divisions and one Vice-President shall be elected from each for a term of two years. The geographical divisions shall be known as:

New York and New England Division.
Middle Eastern Division.
Middle Western Division.
Southern Division.
Pacific Coast Division.

Vice-Presidents shall not be eligible for immediate re-election to the same office.

Section 4. The Secretary and Treasurer shall be appointed to office by the Directors for such terms of office as the Directors may determine.

Section 5. The Board of Directors shall consist of:

One representative from each section, a number elected by the membership at large, the officers of the Society and three past presidents, all as provided hereinafter.

Each Section at its annual meeting shall elect for the term of one year one director of the American Welding Society who may be the Section Chairman.

At each annual meeting the Society shall elect four Directors to serve for a term of three years.

The three junior past presidents shall be automatically members of the Board of Directors.

Section 6. Nominations and elections of the officers shall proceed as follows:

The Secretary shall mail on or before the first Tuesday in February of each year to each member entitled to vote, a notice that Nominations for Officers must reach the Secretary not later than the first day of March. This notice shall outline the vacancies of elective offices that shall be filled at the next regular election and request nominations for such officers. This notice shall contain a copy of this Section and the list of nominees recommended by the Nominating Committee and information that no name shall appear on the final voting ballot unless proposed by at least 25 qualified members. The notice shall also contain the names of the members of the Nominating Committee.

The Secretary shall mail on or before the first Tuesday in March of each year to each member entitled to vote a ballot stating the names of the candidates for the several offices falling vacant, the

time of the closure of the voting. The voter shall prepare his ballot by indicating by means of a cross opposite the name of each candidate he wishes to vote for. The voter shall enclose said ballot in an envelope and seal same. He shall then enclose the sealed envelope in a second envelope marked "Ballot for Officers," seal same and write his name thereon in ink, for identification. The ballot thus prepared and enclosed shall be mailed or delivered unopened to the Tellers of Election.

The Secretary shall certify to the competence and signature of all voters. A ballot without the autographic endorsement of the voter written on the outside envelope is defective and shall be rejected by the Tellers of Election. A ballot which has choice indicated for more names than there are offices to be filled is defective and shall be rejected by the Tellers.

Section 7. The voting for the election of officers shall close at 1 o'clock in the afternoon on the first Thursday in April of each year. The Tellers shall not receive any ballot after the stated time for the closure of voting. The Tellers of Election shall first open and destroy the outer envelopes and shall then open the inner ones, canvass the ballots and certify the results to the Presiding Officer at the first session of the current meeting of the Society. The Presiding Officer shall then announce the candidates having the greatest number of votes for their respective offices and declare them elected for the ensuing year.

Section 8. The names of the candidates proposed by the Nominating Committee and the respective offices for which they are candidates and names of candidates nominated by letter ballot as provided in Section 6 above, shall be printed in separate lists on the same ballot sheet.

Section 9. In case of a tie in the vote for any officer, the President, or in his absence, the Presiding Officer, shall cast the deciding vote.

Section 10. The term of all elective officers shall begin on the adjournment of the annual meeting of the Society. Officers shall continue in their respective offices until their successors have been elected and have accepted their offices.

Section 11. Tellers of Election. The President shall, on or before the first Thursday in April of each year, appoint three Tellers of Election of Officers, whose duty shall be to canvass the votes cast, and certify the same to the President, or Presiding Officer, at the first session of the Annual Meeting. Their term of office shall expire when their report of the canvass has been presented and accepted.

ARTICLE V

Duties of Officers

Section 1. In addition to the duties hereinafter set forth, the officers shall perform such other duties as the Society or Board of Directors shall designate.

Section 2. The President shall preside at all meetings of the Society and of the Board of Directors; he shall have general active management and supervision of the affairs of the Society; shall see that all orders and resolutions of the Board are carried into effect; shall attend generally to its executive business and the supervision and direction of all the other officers in the proper performance of their respective duties; shall submit a report of the operations of the Society for the fiscal year to the Directors at their last regular meeting preceding the annual meeting, and to the members at the annual meeting in April and from time to time shall report to the Board all matters within his knowledge which the interests of the Society may require to be brought to their notice; shall be ex-officio a member of all standing committees; and shall have the general powers and management usually vested in the office of the President of the Society.

Section 3. The Senior Vice-President shall be vested with all the powers, and required to perform all the duties of the President in his absence.

Section 4. The five Vice-Presidents shall be the official representatives of the Society in the Divisions so elected. They are responsible for the general promotion of the Society in their Divisions, that is, for the activities of the present sections and the organization of new sections.

They are expected to attend as many meetings of sections in their Divisions as they can conveniently.

Section 5. The Secretary shall be the executive officer of the Society under the direction of the President and Board of Directors. The Secretary shall attend all meetings of the Society and Board of Directors and record the proceedings thereof. The Secretary shall collect all moneys due the Society and deposit the same in depositories designated by the Board of Directors, reporting such deposit to the Treasurer. The Secretary shall conduct the correspondence of the Society and shall keep full records thereof. Under the President and Board of Directors, the Secretary shall be in responsible charge of all property of the Society. With the approval of the Board of Directors the Secretary shall engage such employees as may be necessary and shall be responsible for the work of all employees of the Society. The Secretary shall perform such other duties as may be assigned to him. The Secretary shall devote his entire time to the affairs of the Society, unless otherwise authorized by the Board of Directors. The Secretary shall be required to furnish bond for the faithful performance of his duties in an amount to be decided by the Board of Directors.

Section 6. The Treasurer shall keep full and accurate accounts of receipts and disbursements in books belonging to the Society, and shall deposit all moneys and valuable effects in the name, and to the credit of the Society, in such depositories as may be designated by the Board of Directors. All checks shall be signed by

the Treasurer. He shall disburse the funds of the Society as may be ordered by the Board, taking the proper vouchers to such disbursements, and shall render to the President and Directors at the meeting of the Board, or whenever they may require it, an account of all its transactions as Treasurer, and of the financial condition of the Society, and at the last regular meeting of the Board preceding the annual meeting of the Society, a like report for the preceding year. He shall give the Society a bond in a sum and with one or more securities as required by and satisfactory to the Board for the faithful performance of the duties of his office, and the restoration to the Society in the case of his death, resignation or removal from office of all books, papers, vouchers, money or other property of whatever kind in his possession belonging to the Society.

ARTICLE VI

Board of Directors

Section 1. The Board of Directors shall have the power:

(a) To manage the affairs of the Society, except as otherwise provided by law, or by these By-Laws.

(b) To purchase or otherwise acquire for the Society any property, rights and privileges which the Society is authorized to acquire, at such prices and on such terms and conditions and for such considerations as they think fit.

(c) To appoint executive officers and fix their salaries.

(d) To determine who shall be authorized to sign, on behalf of the Society, notes, receipts, acceptances, endorsements, checks, releases, any and all contracts and other documents, and shall make such authorization.

(e) To perform such other acts as may be necessary to carry out the purpose of the Society.

Section 2. In each case of vacancy occurring in the Board of Directors through death, resignation, disqualification, or other cause, the remaining Directors, by letter ballot, may elect, or appoint a successor to hold office for the unexpired portion of the term of the retiring Director; and in the event that a quorum of the Board of Directors does not exist, the affirmative vote of a majority of the remaining Directors shall become effective. However, if the retiring Director has been elected by a Section, such Section shall furnish a successor.

ARTICLE VII

Committees

Section 1. With the approval of the Board of Directors, the President shall appoint the following committees:

(a) An Executive Committee, which shall have such duties as

may be prescribed by the Directors to facilitate their work, and such power of the Directors as they may delegate to it from time to time.

(b) A Finance Committee, which shall pass upon all expenditures, prepare the annual budget, and have general charge of the Finances of the Society. The Treasurer shall be Chairman of the Finance Committee.

(c) A Membership Committee of five whose duties shall be to pass upon applications for membership in this Society.

(d) A Meetings and Papers Committee, which shall plan and make arrangements for the meetings of the Society. It shall also solicit and pass upon all papers offered for presentation to the Society, and determine which of the papers presented at the Section meetings shall be published in the proceedings. It shall also have power to edit papers before publication.

(e) A Nominating Committee of five members, not members of the Board of Directors, shall be appointed on or before the 15th of December of each year by the President. This Committee shall deliver to the Secretary in writing on or before the last Tuesday in January the names of its nominees for the various elective offices next falling vacant with a written consent of the nominee.

ARTICLE VIII

Meetings and Notices

Section 1. There shall be two stated meetings of the Society each year, the annual meeting for the election of officers and other business, in New York City, beginning the fourth Thursday in April and the autumn meeting in October at such time and place outside of New York City as may be decided by the Board of Directors. Other meetings may be called at the discretion of the Directors.

Section 2. Notices of all meetings of the Society shall be mailed to the members at least 30 days prior to the date of such meeting, and to the Board of Directors at least two weeks prior to the date of their meeting, and shall contain the time and place of the meeting and the principal business to come before it.

Section 3. Twenty members entitled to vote shall constitute a quorum at meetings of the Society and ten Directors shall constitute a quorum at meetings of the Board of Directors.

ARTICLE IX

Voting and Proxies

Section 1. Voting by proxy shall not be allowed at any meeting of the Society or its Board of Directors or of any of its Committees except by a personal representative presenting written credentials at the particular meeting stated.

ARTICLE X

Cooperative Research and Standardization, American Bureau of Welding

Section 1. The American Welding Society shall provide the means for cooperative research and standardization in welding by creating a research bureau, which shall consist of at least twelve members appointed by the Board of Directors of the American Welding Society, the Chairman of the Research Committee of each Section of the American Welding Society, and of one representative of each of the other interested societies, associations, and governmental departments as indicated in Section 2. Machinery is thus provided to co-ordinate and control all research and standardization in welding in the American Welding Society and its Sections.

It is the intention of this Society to make this Bureau the co-ordinating agency for welding research throughout the country and to this end the Bureau has been accepted by the Engineering Division of the National Research Council as its advisory Committee on Welding.

Section 2. Originally the following bodies shall be invited to designate representatives:

American Bureau of Shipping.
American Electro Chemical Society.
American Engineering Standards Committee.
American Institute of Electrical Engineers.
American Institute Mining and Metallurgical Engineers.
American Physical Society.
American Railroad Association.
American Society of Civil Engineers.
American Society of Mechanical Engineers.
American Society of Refrigerating Engineers.
American Society for Testing Materials.
Bureau of Veritas.
Engineering Foundation.
Lloyd's Register of Shipping.
National Fire Protection Association.
New York Academy of Sciences.
Society of Automotive Engineers.
Bureau of Standards, U. S. Dept. of Commerce.
U. S. Navy Dept. Bureau of Construction and Repairs.
U. S. Navy Dept. Bureau of Ordnance.
Federal Board of Vocational Education.

Section 3. The American Bureau of Welding so constituted shall govern itself under its own rules and by-laws, and shall have its own executive head and officers, and at its discretion may extend its membership to other societies, associations and Govern-

mental Departments and increase its representation from the American Welding Society.

ARTICLE XI

Permanent Office

Section 1. A permanent office of the Society shall be maintained in the City of New York and shall be located in the Engineering Societies' Building at 33 West 39th Street or at such other place as the Directors may determine.

ARTICLE XII

Parliamentary Rules

Section 1. Roberts' Rules of Order shall be the governing parliamentary law of the Society in all cases not definitely provided for by its constitution or its by-laws or its own rules.

ARTICLE XIII

Amendments

Changes in these By-Laws made be made by petition signed by ten or twelve voting members of the Society and approved by not less than two-thirds of the Directors present at a meeting regularly called for consideration of the same. Such changes shall be considered temporary and at the expiration of 60 days after proper letter ballot has been sent to the members of the Society shall be considered permanent, unless rejected by 20 per cent of the voting membership.

Rulings Adopted by Board of Directors

April 1920

Powers of Executive Committee—The Board of Directors delegated to Executive Committee its full power with understanding that Executive Committee will immediately report by letter to every member of the Board any action which it has taken and allow sufficient time for objection to such action before it is put into effect. Should a majority of the Board express objection within a week to any action, the President will then immediately call a special meeting of the Board and have the matter presented to them for confirmation.

Section Organization—The Officers of the Society are authorized to assist in formation of sections in any part of the United States under the adopted standard form of Constitution with variations to meet local conditions and to grant the necessary authority for the formation of such sections. When possible, the sections should

be affiliated with the local general engineering society and where practicable, the organization work should be conducted from such society headquarters.

January, 1922

Delinquents—A delinquent member shall be carried on the rolls of the Society for a period of one year, for the first three months of which he shall be supplied with the proceedings and other literature, but that following the three months, he shall receive only notices of meetings.

Billing Membership Dues—Each member shall be sent a bill on the first day of the month in which his dues become due; a second bill shall be sent one month later with the words "Second Bill" stamped on it, and a third bill shall be sent two months later stamped with the words "Final Notice, You Will Not Receive Publication If Your Dues Are Not Paid."

October, 1922

Refund to New Sections—No money shall be turned over to a newly organized section on dues received previous to the establishment of the section from members located in that particular section.

February, 1923

Financial Arrangement Between New York Section and National Headquarters—Inasmuch as National Headquarters cannot at this time make the same return to the New York Section as is being made to the other Sections of the Society, National Headquarters will pay for expenses of meeting rooms, stationery, notices and other necessary expenses of the Section, and the regular staff of the Society working in conjunction with the Secretary of the Section, will send out notices of meetings, circulars, keep proper records and attend to other routine details.

Plans for establishing Sections of the American Welding Society which received approval at the annual meeting of the Society in April, 1923, are available at National Headquarters. These embrace all steps to be followed under the headings given below:

1. Extracts from Constitution and By-Laws of Society relating to Section Organization.

2. Preliminary Meeting—Notice; order of business; application to National Organization for authority to operate as section; suggestions to nomination committee.

3. Organization Meeting—Notice; order of business.

4. Method of Conducting Section Work—Affiliation with some engineering body so as to provide meeting place for monthly meetings and in that way give the section a better technical standing; standard method for handling applications, financial records and reports.

Annual Report

American Bureau of Welding

The American Bureau of Welding acts as an advisory research board on welding of the American Welding Society and of the Division of Engineering and Industrial Research of the National Research Council. In addition to representatives from the American Welding Society, it includes also representatives from some twenty other interested scientific and engineering bodies.

When the American Welding Society was organized, the founders appreciated the value of research work in the welding field and made the Bureau the backbone of the Society. Fortunately, too, for the welding industry, the Bureau has been closely identified with National Research Council from the beginning and this has brought to it a broader vision and a more general appreciation of the aspects of fundamental research.

The American Bureau of Welding was reorganized about five years ago to continue the welding investigations started during the war. Research work was subdivided among a number of subcommittees, each undertaking specific problems. For the most part, this work involved the sifting and correlation of existing knowledge on many practical problems. Gradually this work was completed and the Bureau has to its credit more than thirty separate reports.

The success that attended the efforts of the American Bureau of Welding in this direction led to a gradual strengthening of its position in the industry and an attainment of a very creditable standing. It was also quite natural that with the successful solution of these smaller problems the Bureau should be called upon to undertake investigations of a bigger scope and of far-reaching importance.

With the applications of welding in newer fields and particularly in fields where life and property are at stake, it has become increasingly difficult to give satisfactory reasons why this or that result is obtained in practice. Engineers, legislators and scientific people interested, have requested proofs instead of opinions, and test results instead of merely service experience. The properties of welds have become better known and their limitations as well as their capabilities have become more clearly defined. But even today the question of the *WHY* of many things connected with welding remains unanswered. The Bureau provides an opportunity to secure this information on a cooperative basis at a minimum cost to the welding industry. By its method of organization, it is able to secure the necessary diversified scientific talent and experts needed to solve the many complicated welding problems.

The results of the Bureau's investigations are applicable not only to the special specific problems for which they were undertaken, but also in allied fields. Paralleling the conduct of these researches, there has been gradually developed an information service which

is known and used throughout the civilized world. Requests for information have come from South Africa, Australia, Japan, Siberia and the various European countries.

Among the problems now receiving consideration of the American Bureau of Welding may be listed (1) welded rail joints, (2) welded pressure vessels, (3) welding of structural steel, (4) welding wire specifications, (5) study of welds subjected to elevated temperatures, (6) fundamentals of arc welding, (7) fundamental problems in welding.

Welded Rail Joints

About $25,000 in cash was raised for this investigation and contribution of services, materials and testing facilities would bring the total cost of this investigation well over $100,000. As is true in all investigations of this nature, the practical problems must be answered as rapidly as possible. A great deal of testing was done which was outlined for the most part by practical engineers. Some very valuable information was secured in this way, but there is being brought about a greater appreciation of the value of more fundamental investigations. It has been roughly estimated by the vice-chairman of this committee that if the committee's efforts are successful in improving the life of the joint 25 per cent, that there would accrue an anual saving to the street railways of this country of $15,000,000.

Four progress reports, including a total of 316 printed pages, have been published, giving the test results obtained by this committee to date.

Pressure Vessels

In the field of pressure vessels, the Bureau carried out a $15,000 investigation to supply engineers, and particularly the A. S. M. E. Boiler Code Committee, with needed information which would enable it to draw up a satisfactory code governing the use of welding in the construction of such vessels. Recognizing the incompleteness of the present Code, the A. S. M. E. has recently authorized the conduct of a joint investigation with the American Welding Society of a much larger and more elaborate investigation, which will not only include practical tests but many fundamental investigations in the nature of welds and which will probably involve an expenditure of more than $100,000. It is proposed to also carry out this investigation under the auspices of the National Research Council, which will be called upon to act as fiscal agent.

The organization of the personnel of the committee is now well under way.

Structural Steel

The possibilities of the use of welding in the fabrication of steel structures to replace riveting has for several years been appreciated by the welding fraternity. A number of independent in-

vestigations have been started in different parts of this country and abroad to demonstrate the adequacy of welding for some specific job. Although these investigations are incomplete and uncoordinated, nevertheless, they have brought about an interest on the part of fabricators and structural-steel engineers. Several small buildings and other structures have been successfully fabricated by welding. For the most part, however, these structures have originally been designed for riveting and not specially for welding so that the full advantage of welding has not been attained.

Welding enthusiasts have expressed themselves forcibly that welding will result in large economies and superiority of product. The more conservative members of the welding fraternity admit that the first few structures may cost more than riveted ones because of the well-organized and standardized methods used in the latter method of fabrication. They also concede that wide application of welding in this field can be brought about only through the cooperation of all concerned, including steel fabricators and structural engineers.

Through the cooperation of the American Institute of Steel Construction, the American Bureau of Welding has organized a Structural Steel Welding Committee, which will make comprehensive investigations in this field. J. H. Edwards, assistant chief engineer of the American Bridge Company, has been selected as chairman of the committee. The Iron and Steel Institute, the American Society for Testing Materials and the American Society of Civil Engineers have each been asked to appoint a representative on this committee.

It is expected that the program will include investigations which will yield information needed by engineers in designing such structures, cost figures and also the adequacy of welding for this purpose. An advantage sometimes lost sight of in favor of welding is the elimination of noise. One of the greatest economies which may result from the use of welding will be the substitution of structural members of lighter section than that used in riveting. For example, girders may be considered as continuous beams rather than a beam supported at the two ends in the present riveted designs.

Missionary work has been going on in interesting the large steel fabricators and unofficially the Bureau has been assured of the necessary support and cooperation when the work is finally undertaken. The total cost in this direction is somewhat staggering to a young and growing industry such as welding, for in all probability it will total well over $200,000.

Welding Wire

It has been conceded by welding experts that the quality of the welding wire is one of the important factors in obtaining successful welds. Recognizing the need for some specifications in this field, the Bureau, after a great deal of investigational work, issued specifications controlling chemical composition of welding wire to

be used for different purposes. The chemical composition, however, is not a complete criterion. For example, wide variations in the chemical composition of the deposited metal are obtained when welding wire of identically the same chemical composition is used. The physical structure, gas content and surface coating appear to exert considerable influence on the results. However, the phenomenon is still far from being understood. These problems are now receiving consideration of the Welding Wire Specifications Committee.

Welds Subjected to Elevated Temperatures

This work was originally started by the Gas Welding Committee of the Bureau. Following out the plan of regional research proposed by the American Bureau of Welding this work has been assigned to the San Francisco Section of the American Welding Society. Confining the work to one local section permits frequent meetings and more rapid progress and eliminates a great deal of time and money spent in traveling. The program has been extended to include arc welds, as well as gas welds. A great deal of apparatus will have to be designed by this committee in its preliminary studies of the action of welds under various temperature conditions and under various stresses.

Fundamentals of Arc Welding

During the war there was started under the auspices of the Emergency Fleet Corporation an elaborate comprehensive series of tests to determine the effect of certain fundamental elements on the quality of arc welds. These investigations cover varying currents, positions of welding, technique of welding, different types of joints, methods of preparing joints, etc. The testing of these samples have continued during the past year and a preliminary report has been presented to the Electric Arc Welding Committee. The results of these tests are now being analyzed and it is hoped that in the near future the final report will be made available.

Fundamental Problems of Welding

There has come about a gradual appreciation of the need of more fundamental investigations than that previously undertaken. In order to bring to the attention of welding engineers some of the more important problems dealing with the fundamentals of welding, several papers were presented at the annual meeting of the American Bureau of Welding listing these and suggesting possible methods of attack. A committee has been appointed by the Bureau to consider ways and means of carrying out some of the more important of these investigations.

Published Reports

Recently the National Research Council has compiled a list of published reports of various committees of the Division of Engi-

neering, including those on welding. This list includes also the more important papers published by the officers of the Bureau and the officers of the various research committee chairmen when such reports relate to the work of the Bureau or its various committees. A list of the reports as compiled by the Council is given below, with a few additions of those of recent date.

AMERICAN BUREAU OF WELDING

The American Bureau of Welding. The Advisory Board on Welding Research and Standardization of the American Welding Society and of the Division of Engineering of the National Research Council. New York, November, 1921. 24 pp.

BARTON, T. F. Relation of the Society to the industry. *Journal of the American Welding Society*, Vol. 2, No. 10, pp. 45-6, 1923.

GOLDMARK, H., SPRARAGEN, W., and WARNER, W. L. Welding as a method of fabricating large structures. *Journal of the American Welding Society*, Vol. 3, No. 10, pp. 27-69, 1924.

HOBART, HENRY M. Welding mild steel. *Bulletin of the American Institute of Mining Engineers*, No. 146, pp. 517-61, 1919; *Proceedings of the American Institute of Electrical Engineers*, Vol. 38, pp. 561-609, 1919.

SPRARAGEN, WILLIAM. Speed of metallic arc welding. *Welding Engineer*, Vol. 5, No. 6, pp. 44-7, 1920.

——. Fluxes and slags in welding. *Transactions of the Faraday Society*, Vol. 20, July, 1924; *Journal of the American Welding Society*, Vol. 3, No. 4, pp. 36-47, 1924; *Foundry Trade Journal*, Vol. 29, pp. 414-6, 1924.

——. Oxy-acetylene torch as a tool for the erection of large structures. *Journal of the American Welding Society*, Vol. 3, No. 10, pp. 69-71, 1924.

——. Welding and its possibilities. *American Metal Market*, Vol. 32, pp. 6, 8, 10, 19, August 15, 1925.

——. Welding progress in 1925. *Canadian Machinery and Manufacturing News*, Vol. 24, No. 27, pp. 154, 175, 1925.

——. What place has welding in future building construction? *Factory*, Vol. 37, No. 1, pp. 147-158, 1926.

——. What technical foundation should foreman welders possess? *Journal of the American Welding Society*, Vol. 1, No. 6, pp. 24-6, 1922.

——. The American Bureau of Welding and organized research. *Journal of the American Welding Society*, Vol. 1, No. 8-9, pp. 14-20, 1922.

——. Recent developments in welding methods. *American Machinist*, Vol. 60, p. 79, 1924.

——. Technical work of the Society. *Journal of the American Welding Society*, Vol. 2, No. 10, pp. 46-8, 1923.

——. Standardization in welding. *Journal of the American Welding Society*, Vol. 2, No. 4, pp. 37-9, 1923.

WARNER, W. L. Recent developments in the arc welding field. *Journal of the American Welding Society*, Vol. 2, No. 4, pp. 10-30, 1923.

Committee on Electric Arc Welding

Cast iron welding. General consideration. (Joint report with Gas Welding and Thermit Welding Committee). *Journal of the American Welding Society*, Vol. 1, No. 8-9, pp. 37-46, 1922.

EWERTZ, E. H. Applications of arc welding to ship construction. *Marine Engineering and Shipping Age*, Vol. 29, pp. 47-54, 114-21, 124, 1924. Reprinted as *Bulletin of the American Bureau of Welding*, No. 6. 1924. 54 pp.

HOBART, H. M., and SPRARAGEN, WM. Arc welding as a manufacturing process. *Journal of the American Welding Society*, Vol. 4, No. 10, pp. 71-103, 1925.

——. Research the beacon of progress in arc welding. *Journal of the American Welding Society*, Vol. 5, No. 5, pp. 13-17, 1926.

NAMACK, W. H. Arc welding of cast iron. *Journal of the American Welding Society*, Vol. 1, No. 8-9, pp. 47-71; No. 11, pp. 7-33, 1922.

Report to the American Bureau of Welding on Standards for arc welding apparatus. *Journal of the American Welding Society*, Vol. 1, No. 6,

pp. 28-32, 1922. Reprinted as *Bulletin* of the American Bureau of Welding, No. 3. 1922. 7 pp.

Summary of information on arc welding of copper, brass and bronze in the literature up to March, 1923. *Journal of the American Welding Society*, Vol. 3, No. 3, pp. 9-15, 1924.

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Committee on Gas Welding

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Committee on Specifications for Steel to Be Welded

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Committee on Standard Tests for Welds

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Committee on Welding Structural Steel

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Committee on Thermit Welding

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Committee on Welding Wire Specifications

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AMERICAN BUREAU OF WELDING

OFFICERS

Director: C. A. ADAMS, Harvard University.
First Vice-Director: H. L. WHITTEMORE, Bureau of Standards.
Second Vice-Director: A. D. RISTEEN, Travelers Insurance Company.
Secretary: W. SPRAGAGEN, Division of Engineering, National Research Council.

EXECUTIVE COMMITTEE

Chairman: C. A. ADAMS, Harvard University.
Secretary: W. SPRAGAGEN, Division of Engineering, National Research Council.
J. H. DEPPELER, Metal and Thermit Corporation.

J. H. EDWARDS, American Bridge Company.
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H. M. HOBART, General Electric Company.
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A. D. RISTEEN, Travelers Insurance Company.
E. M. T. RYDER, Third Avenue Railway System.
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AMERICAN WELDING SOCIETY REPRESENTATIVES ON BUREAU

C. A. ADAMS, Harvard University.
W. J. BECK, American Rolling Mill Company.
A. M. CANDY, Westinghouse Elec. and Mfg. Co.
J. H. DEPPELER, Metal and Thermit Corporation.
F. M. FARMER, Electrical Testing Laboratories.
H. GOLDMARK, Consulting Engineer.
C. J. HOLSLAG, Electric Arc Cutting and Welding Company.
A. S. KINSEY, Stevens Institute of Technology.
A. KREBS, General Welding and Equipment Company.
W. REMINGTON, Thomson Electric Welding Company.
A. D. RISTEEN, Travelers Insurance Company.
H. S. SMITH, Prest-O-Lite Company.

SECTION REPRESENTATIVES OF AMERICAN WELDING SOCIETY

Cleveland:
HUGH H. DYAR, Linde Air Products Company.
New York:
J. L. ANDERSON, Air Reduction Sales Company, and J. S. MCWHIRTER, Third Avenue Railway System.
Detroit:
G. A. MOORE, Detroit Range Barrel Company.
Western New York:
ERNEST BAUER, U. S. Light and Heat Corporation.
Northern New York:
R. E. WAGNER, General Electric Company.
San Francisco:
G. O. WILSON, Standard Oil Company.

REPRESENTATIVES ON BUREAU OF OTHER SOCIETIES

American Bureau of Shipping:
DAVID ARNOTT, American Bureau of Shipping, 50 Broad Street, New York City.
American Electro-Chemical Society:
S. W. MILLER, Union Carbide and Carbon Res. Lab., Thompson Avenue and Manley Street, Long Island City, N. Y.
American Electric Railway Association:
E. M. T. RYDER, Third Avenue Railway System, Third Avenue and 130th Street, New York City.
American Engineering Standards Committee:
G. C. STONE, New Jersey Zinc Company, 50 Wall Street, New York City.
American Institute of Electrical Engineers:
H. M. HOBART, General Electric Company, Schenectady, N. Y.
American Institute of Mining Engineers:
BRADLEY STOUGHTON, Lehigh University, Bethlehem, Pa.
American Institute of Steel Construction:
L. H. MILLER, 1052 Leader Building, Cleveland, Ohio.
American Physical Society:
A. W. SLOCUM, University of Vermont, Burlington, Vt.
American Society of Civil Engineers:
L. H. DAVIS, Union Carbide and Carbon Corporation, 30 East Forty-second Street, New York City.
American Society of Mechanical Engineers:
F. L. FAIRBANKS, Quincy Market Cold Storage and Warehouse Company, Boston, Mass.

American Society of Refrigerating Engineers:
L. DOELLING, De La Vergne Machine Company, Foot East 138th Street, New York City.
American Society for Testing Materials:
F. M. FARMER, Electrical Testing Laboratories, Eightieth St. and East End Avenue, New York City.
Bureau of Construction and Repairs and Bureau of Ordnance:
J. I. HALE, U. S. Navy Yard, Brooklyn, N. Y.
Bureau of Standards:
H. L. WHITTEMORE, Bureau of Standards, Washington, D. C.
Bureau Veritas:
H. S. STARLING, Bureau Veritas, 17 State Street, New York City.
Engineering Foundation:
H. M. BOYLSTON, Case School of Applied Science, Cleveland, Ohio.
Federal Board of Vocational Education:
J. C. WRIGHT, Federal Board of Vocational Education, Washington, D. C.
Lloyd's Register of Shipping:
J. FRENCH, Lloyd's Register of Shipping, 17 Battery Place, New York City.
National Research Council:
G. H. CLEVENGER, U. S. Smelting and Refining Company, 55 Congress Street, Boston, Mass.
New York Academy of Sciences:
A. C. MORRISON, International Acetylene Association, 30 East Forty-second Street, New York City.
Society of Automotive Engineers:
A. CHURCHWARD, Wilson Welder and Metals Company, Hoboken, N. J.

MEMBERS AT LARGE, AMERICAN BUREAU OF WELDING

A. F. JENKINS, Alexander Milburn Company.
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J. L. CHRISTIE, Bridgeport Brass Company.
A. CHURCHWARD, Wilson Welder and Metals Company.
J. J. CROWE, Air Reduction Company.
F. C. ELDER, American Steel and Wire Company.
J. B. GREEN, Chicago Steel and Wire Company.
C. J. HOLSLAG, Electric Arc Cutting and Welding Company.
H. J. HORN, J. A. Roebling's Sons Company.
S. W. MILLER, Union Carbide and Carbon Research Laboratory.
A. MILNE, American Society for Testing Materials.
J. W. OWENS, Newport News Shipbuilding and Dry Dock Company.
W. C. SWIFT, American Brass Company.
E. WANAMAKER, Rock Island Lines.

STRUCTURAL STEEL WELDING COMMITTEE
(In Process of Organization)

Chairman: J. H. EDWARDS, American Bridge Company.
Secretary: W. SPRAGEN, Division of Engineering, National Research Council.

COMMITTEE ON WELDED RAIL JOINTS

Chairman: G. K. BURGESS, Bureau of Standards.
Vice-Chairman: E. M. T. RYDER, Third Avenue Railway System.
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E. O. ACKERMAN, Columbus Railway Power and Light Company.
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W. P. BOYARD, Ohio Brass Company.

A. CHURCHWARD, Wilson Welder and Metals Company.
C. CLARK, Cleveland Railways.
J. J. CURRAN, The Henry Souther Engineering Company.
H. A. CURRIE, The New York Central Railroad Company.
R. H. DALGLEISH, The Capital Traction Company.
J. H. DEPPELER, Metal and Thermit Corporation.
G. C. ESTILL, New Orleans Railway and Light Company.
D. D. EWING, Purdue University.
G. C. FARKELL, National Tube Company.
R. B. FEHR, Una Welding and Bonding Company.
R. H. FINDLEY, Omaha and Council Bluffs Street Railway Company.
C. F. GAILOR, Consulting Engineer.
C. W. GENNET, JR., Robert W. Hunt and Company.
H. M. GOULD, Department of Street Railways, City of Detroit.
W. F. GRAVES, Terre Haute, Indianapolis and Eastern Traction Company.
J. O. HANDY, Pittsburgh Testing Laboratory.
G. C. HECKER, American Electric Railway Association.
C. H. JEWETT, Interborough Rapid Transit Company.
E. F. KENNEY, Bethlehem Steel Company.
C. S. KIMBALL, Washington Railway and Electric Company.
H. F. A. KLEINSCHMIDT, Lorain Steel Company.
J. C. LINCOLN, Lincoln Electric Company.
E. J. MCILRAITH, Chicago Surface Lines.
H. F. MERKER, Brooklyn City Railroad Company.
E. C. PRICE, The Indianapolis Switch and Frog Company.
J. K. PUNDERFORD, Connecticut Company.
G. W. SMITH, San Antonio Public Service Company.
S. A. STEPHENSON, JR., Rutgers College.
H. M. STEWARD, Boston Elevated Railway Company.
J. K. TUTHILL, University of Illinois.
E. VOM STEEG, JR., General Electric Company.
F. B. WALKER, Eastern Massachusetts Street Railway Company.
A. P. WAY, American Electric Power Company.
H. L. WHITTEMORE, Bureau of Standards.
G. L. WILSON, Minneapolis Street Railway Company.
J. WOLFE, Chicago Surface Lines.
W. W. WYSOR, United Railways and Electric Company of Baltimore.

ELECTRIC ARC WELDING COMMITTEE

Chairman: H. M. HOBART, General Electric Company.
Secretary: W. SPRAGAGEN, Division of Engineering, National Research Council.
C. W. BATES, Philadelphia Electric Company.
W. J. BECK, American Rolling Mill Company.
A. G. BISSELL, Westinghouse Electric and Manufacturing Company.
A. M. CANDY, Westinghouse Electric and Manufacturing Company.
A. CHURCHWARD, Wilson Welder and Metals Company.
E. H. EWERTZ, Bethlehem Shipbuilding Corporation, Moore Plant.
F. M. FARMER, Electrical Testing Laboratories.
C. J. HOLSLAG, Electric Arc Cutting and Welding Company.
E. S. HURD, Gibb Instrument Company.
J. C. LINCOLN, Lincoln Electric Company.
O. T. NELSON, General Boilers Company.
J. W. OWENS, Newport News Shipbuilding and Dry Dock Company.
J. N. RIPPLE, Federal Shipbuilding Company.
A. W. SLOCUM, University of Vermont.
R. E. WAGNER, General Electric Company.
E. WANAMAKER, Chicago, Rock Island and Pacific Railway Company.
W. L. WARNER, General Electric Company.

GAS WELDING COMMITTEE

Chairman: S. W. MILLER, Union Carbide and Carbon Research Laboratories.
Secretary: W. SPRAGAGEN, Division of Engineering, National Research Council.
F. S. AUSTIN, Carbo-Hydrogen Company of America.

W. J. BECK, American Rolling Mill Company.
G. O. CARTER, Union Carbide Sales Company.
J. J. CROWE, Air Reduction Company.
W. D. FLANNERY, K-G Welding and Cutting Company.
F. C. FYKE, Standard Oil Company.
J. H. HALL, Taylor-Wharton Iron and Steel Company.
A. S. KINSEY, Air Reduction Sales Company.
K. V. LAIRD, A. S. Lindstrom Company.
C. A. MCCUNE, American Chain Company.
W. B. MILLER, Union Carbide and Carbon Research Laboratories.
A. W. MOULDER, Grinnell Company.
C. W. OBERT, Boiler Code Committee, A.S.M.E.
J. PARTINGTON, American Locomotive Company.
L. H. ROLLER, De La Vergne Machine Company.
W. A. SLACK, Torchweld Equipment Company.
H. S. SMITH, Prest-O-Lite Company.
F. N. SPELLER, National Tube Company.
H. L. WHITTEMORE, Bureau of Standards.

By-Laws

AMERICAN BUREAU OF WELDING

ARTICLE I

Name

The name of this organization shall be the AMERICAN BUREAU OF WELDING.

ARTICLE II

Functions of the Bureau

(1) To act as an advisory body to the American Welding Society and to the Engineering Division of the National Research Council on matters pertaining to welding research.

(2) To act as a coordinating body in welding research and standardization.

(3) To advance the science and art of welding by stimulation of welding research and standardization.

(4) To do all other things incidental or conducive to the above-named objects.

ARTICLE III

Membership

The membership shall consist of—

(a) Twelve representatives appointed by the American Welding Society (selected by the Board of Directors of that Society) for their special fitness and interest in welding research.

(b) Two representatives from each Section of the American Welding Society, one from each Section to be a representative of the Research Committee of such Section and the other to be appointed by the Section to serve on the Ways and Means Committee of the Bureau.

(c) One representative or, upon vote of the Executive Committee, two representatives from each of the following Scientific Societies and Governmental Departments and other interested organizations accepting the invitation to become members.

American Bureau of Shipping.
American Electrochemical Society.
American Engineering Standards Committee.
American Institute of Electrical Engineers.
American Institute of Mining Engineers.
American Institute of Steel Construction.
American Physical Society.
American Railway Association.
American Society of Civil Engineers.
American Society of Mechanical Engineers.
American Society of Refrigerating Engineers.
American Society for Testing Materials.
Bureau Veritas.
Engineering Foundation.
Lloyd's Register of Shipping.
National Research Council.
New York Academy of Sciences.
Society of Automotive Engineers, Inc.
United States Department of Commerce, Bureau of Standards.
United States Navy Department.
The Federal Board of Vocational Training.

Additional Scientific Societies and Governmental Departments may be invited to appoint representatives to become members upon the approval of the Executive Committee.

(d) Certain members-at-large chosen because of their ability to advance the work of the Bureau. These appointments are to be made by the Executive Committee and shall not at any one time exceed twelve.

ARTICLE IV

There shall be no annual or other dues. Funds for the work of the Bureau shall be secured by voluntary contributions. The solicitation of such funds shall conform to the regulations of the National Research Council and of the American Welding Society.

ARTICLE V

Officers, Nominations and Elections

Section 1. The Officers of the Bureau shall be as follows: A Director, two Vice-Directors, a Secretary and a Treasurer.

Section 2. At the first meeting of the American Bureau of Welding the officers shall be elected by a majority vote of those present and voting, the nominating therefor being made by a committee of five appointed by the Chair. The officers so chosen shall hold office from the date of their election until the next following annual meeting of the Bureau and until their successors shall be elected and qualified.

Section 3. At each annual meeting an election shall be held to select officers of the Bureau for the ensuing year. The officers so chosen shall hold office until the next following annual meeting and until their successors shall be elected and qualified. Any officer shall be eligible for immediate reelection.

Section 4. An interim vacancy among the officers shall be filled by a majority of the members voting by letter ballot, the nominations therefor being made by any ten members in writing to the Secretary at least twenty days prior to the call for said letter ballot.

ARTICLE VI

Duties of Officers

Section 1. The Director shall have general supervision of the affairs of the Bureau subject to its direction. He shall preside at

its meetings and shall be ex-officio a member of all committees.

Section 2. In the absence of the Director, a Vice-Director shall preside at meetings of the Bureau and otherwise perform the duties of the Director.

Section 3. The Secretary and Treasurer shall perform the duties usually appertaining to those officers in similar organizations.

ARTICLE VII

Committees

Section 1. The Director shall appoint an Executive Committee, which shall have such power as the Bureau may delegate to it from time to time. In general it will be the function of the Executive Committee to conduct the ordinary business of the Bureau.

Section 2. The Director shall appoint a Ways and Means Committee to devise ways and means for conducting the work of the Bureau.

Section 3. The Bureau shall create from time to time research committees, the Chairmen of which shall be appointed by the Executive Committee. The Chairmen of the several committees so created shall appoint the individual members thereof, subject to the approval of the Executive Committee, to the approval of the American Welding Society and to the approval of the National Research Council.

ARTICLE VIII

Meetings and Notices

Section 1. There shall be an annual meeting of the Bureau to be held on the same day as that of the annual meeting of the American Welding Society.

Section 2. Meetings of the Bureau shall take place at the call of the Director.

Section 3. Notices of all meetings of the Bureau shall be mailed to the members at least two weeks prior to the time of such meetings, except as otherwise provided in these By-Laws, and shall state the time and place of the meeting and the principal business to come before it.

Section 4. Fifteen members shall constitute a quorum.

ARTICLE IX

Voting by Proxies

Section 1. Voting by proxy shall not be allowed at any meeting of the Bureau or of any of its committees, except by a personal representative not otherwise entitled to vote.

ARTICLE X

Publications

Publications of the Bureau in the form of papers will in general be printed in the Proceedings of the American Welding Society.

The Executive Committee shall have the authority to pass on all matters relating to publicity and publications of the Bureau and its committees.

ARTICLE XI

Parliamentary Rules

Section 1. Roberts' Rules of order shall be the governing parliamentary law of the Bureau in all cases not definitely provided by its By-Laws or its own rules.

ARTICLE XII

Amendments

Section 1. These By-Laws may be amended, repealed or added to by a majority vote of the members of the Bureau present at any regular meeting or at any special meeting duly called for that purpose.

Section 2. All proposed amendments, repeals or additions to the By-Laws shall be presented to the Secretary in writing at least thirty days prior to the regular or special meeting at which it is desired the same should be considered, and the Secretary shall send a notice which shall contain a copy of such proposal to the members of the Bureau at least ten days prior to such meeting.

Everyone identified with the Welding Industry should be a member of the American Welding Society.

Fill in the Application Blank given in the Advertising Section and send it in to the Secretary of the Society.

Catalogue of Membership

August 1, 1926

Honorary Members

Adams, Comfort A., Prof. of Eng. and Consulting Engineer, Harvard Engineering School, Pierce Hall, Cambridge, Mass.

Fouche, Edmund, President, Chambre Syndicate de L'Acetylene de la Soudure Autogene; (Res.) 104 Boulevard de Clinchy, Paris.

Thomson, Elihu, Consulting Engineer, General Electric Co., Lynn, Mass.

LIST OF MEMBERS OF ALL GRADES

Arranged Alphabetically

EXPLANATORY NOTE

The following alphabetical list contains the names of members of all grades. The letter in parentheses immediately after each name indicates the class to which the member belongs. Where members desire to have their mail sent to their residence the home address is given and is preceded by (Res.). A list of members showing the geographical distribution follows the alphabetical list.

Ackerman, Roger O. (C), Electrical Engineer, Bldg. 34, General Electric Co., Schenectady, N. Y.

Adams, Comfort A. (E), Lawrence Prof. of Engineering, Harvard Engineering School, Pierce Hall, Cambridge, Mass.

Adamson, Daniel (B), Engineer, Joseph Adamson & Co., P. O. Box 4, Hyde, Cheshire, Eng.

Agostine, Vincent F. (D), Welder, E. G. Budd Mfg. Co.; (Res.) 1915 Rowan St., Philadelphia, Pa.

Albert, Geo. M. (B), Superintendent, Western Gas Construction Co., 1429 Buchanan St., Ft. Wayne, Ind.

Aldrich, Wm. (B), Representative, Metal & Thermit Corp., South San Francisco, Cal.

Alexander, Peter P. (C), Research Engineer, Thomson Research Laboratory, General Electric Co., Lynn, Mass.

Allan, F. W. (B), President, Ferguson Allan Co., Fidelity Bldg., Buffalo, N. Y.

Allen, Chas. T. (B), Secretary-Treasurer, Gas Products Association, 140 S. Dearborn St., Chicago, Ill.

Anderson, E. S. (B), Superintendent, Anderson-Barngrover Mfg. Co.; (Res.) 73 Cleaves Ave., San Jose, Cal.

Anderson, James L. (B), Industrial Engr., Air Reduction Sales Co., 342 Madison Ave., New York, N. Y.

Ard, Ligon B. (D), Manager, Chase Companies, 2461 E. 8th St., Los Angeles, Cal.

Ardouin, Louis R. (C), L. A. Mutual Bldg. & Loan Assn., 2931 Willow Pl., Southgate, Cal.

Armor, Jas. C. (D), Electrical Engineer, Pittsburgh Transformer Co.; (Res.) 50 Fordham Ave., West View, Pittsburgh, Pa.

Arnison, Joseph W. (D), Welder, Benoni Welding & Cutting Co.; (Res.) 35a Victoria Ave., Benoni, Transvaal, South Africa.

Arnott, David (A), Chief Surveyor, American Bureau of Shipping, 50 Broad St., New York, N. Y.

Atkinson, R. H. (B), Salesman, Page Steel & Wire Co., American Chain Co., Inc., 837 Pacific Bldg., San Francisco, Cal.

Austin, Calvin C. (D), Acetylene Welder; (Res.) 2108 Davidson Ave., New York, N. Y.

Austin, Frank E. (B), President, Austin Brothers, 1815 Coombs St., Dallas, Tex.

Auten, Hurley (D), Arc Welder, American Car & Foundry Co.; (Res.) R. D. 1, Milton, Pa.

Axelson, Edwin C. (D), Foreman, Standard Oil Co. of California, Richmond, Cal.

Babcock, Court W. (B), Sales Engineer, Westinghouse Elec. & Mfg. Co., 10 High St., Boston, Mass.

Bachman, Elwood (C), Welding Specialist, General Electric Co., 1016 Continental Bank Bldg., Salt Lake City, Utah.

Baker, F. H. (B), General Manager, Baker Mfg. Co., Saratoga Springs, N. Y.

Baldwin, John W. (D), Welder, Sou. Pacific R. R. Co.; (Res.) 469 S. Evergreen Ave., Los Angeles, Cal.

Barbey, F. A. (C), N. E. Representative, Commercial Acetylene Co., 683 Atlantic Ave., Boston, Mass.

Barker, George N. (C), Sales Engineer, General Electric Co., P. O. Box 732, Portland, Ore.

Barnes, William H. (C), Supervisor, Boston Elevated Railway; (Res.) 925 Tremont St., Boston, Mass.

Barnes, Wm. W. (B), District Manager, Air Reduction Sales Co., Germantown and Allegheny Aves., Philadelphia, Pa.

Barron, P. F. (D), Acetylene Welder, (Res.) 952 East Ontario St., Philadelphia, Pa.

Barry, Alfred M. (B), President and General Manager, St. Lawrence Welding & Engineering Wks., Ltd., 138 Inspector St., Montreal, Que.

Bartz, E. J., Jr. (C), Superintendent, General Elec. Co., East Lake Rd., Erie, Pa.

Bates, Clifford W. (B), Research Assistant to the Chief Engineer, Philadelphia Electric Co., 1000 Chestnut St., Philadelphia, Pa.

Bateman, Hubert Irving (C), Demonstrator and Salesman, Alexander Milburn Company; (Res.) 51 St. James Ave., Toronto 5, Ont., Canada.

Bauer, Ernst (A), Electrical Engineer, U. S. Light & Heat Corp., Niagara Falls, N. Y.

Bauer, Walter (D), Foreman Tank Shop and Welding Engineer, Rice & Adams Corp., Buffalo, New York.

Baugh, W. D. (D), Proprietor, Greenwood Welding Works, Box 182, Greenwood, Miss.

Baumer, J. Harry (C), Welding Engineer, Genesee Welding Works, 49 Anthony St., Rochester, N. Y.

Beall, John S. (A), President, Beall Pipe & Tank Corporation, Columbia Blvd. and Derby St., Portland, Ore.

Beard, Wm. F. (C), Welding Foreman, S. P. & S. R. R.; (Res.) 322 West 26th St., Vancouver, Wash.

Beath, L. B. (B), Vice-President, W. D. Beath & Son, Ltd., 394 Symington Ave., Toronto, Canada.

Beck, Wesley J. (A), Director of Research, American Rolling Mill Co., Middletown, Ohio.

Begtrup, Edward F. (B), Master Mechanic, Metal & Thermit Corp., 92 Bishop St., Jersey City, N. J.

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McKee, J. F.
Meadowcroft, J. W.
Newman, J., Jr.
Oechsle, J. S.
Ortlieb, J. P.
Powell, C. H.
Purviance, J. N.
Regan, E. P.
Reid, M. E.
Rusk, C. M.
Schaffer, A. H.
Seddon, J. B.
Shea, H. A.
Steinmetz, J. A.
Sullivan, J. E.
Thomas, R. D.
Thomson, J. S.
Truitt, D. B.
Walker, A. C.
Walz, C. H.
Way, A. P.
Ziegler, A. A.

Pittsburgh—
Armor, J. C.
Bissell, A. G.
Carins, S. B.
Candy, A. M.
Conway, J. D.
Danforth, G. H.
Davies, A. J.
Haley, J. E.
Hollis, H. E.
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MacPherson, T.
Mann, S. W.
Mesta, L. A.
Peterson, C. C.
Roberts, S. S.
Rodgers, F. L.
Smith, A.

Pittsburgh—Cont'd
Speller, F. N.
Tanner, R. J.
Tate, F. S.
Togawa, R. H.
Warfel, J. A.

Russelton—
Evans, O.

Scranton—
Jones, G. M.
Warneka, L. D.

Sharon—
Shanor, E. E.

Springboro—
Joiner, C. W.

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Warren—
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Shellhammer, A. L.

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Emrick, J. B.

Williamsport—
Maynard, G. E.

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Nicholson, H. L.

York—
Shipley, T.
Tonning, A. F.

TENNESSEE

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McKinney, M. O.

TEXAS

Dallas—
Austin, F. E.

Houston—
Garrett, M. T.

Orange—
Linscomb, A. J.
Parsons, J. M., Jr.
Parsons, J. M., Sr.

San Antonio—
Dunaway, G. W.
Gehlert, C. M.

Sherman—
Totten, H. L.

Vernon—
Cheakas, G.

Waco—
Dee, W. F.

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Salt Lake City—
Bachman, E.
Phillips, A. B.

VERMONT

Brattleboro—
Dunklee, R.

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Newport News—
Owens, J. W.

WASHINGTON

Charleston—
Davis, R. H.

Everett—
Cooper, F. H.

South Tacoma—
Yates, L.

Vancouver—
Beard, W. F.

WEST VIRGINIA

Benwood—
Mylone, M.

Huntington—
Chapman, A. B.
Henson, J. P.

McComas—
Schaffer, A. L.

WISCONSIN

Beloit—
Shelstad, O. E.

Milwaukee—
Brumder, H. O.
Fiddymont, E. L.
Hansen, K. L.
Jasper, T. M.
Kremer, W. R.
Langstroth, C. B.

PANAMA

(Canal Zone)

Cristobal—
O'Neil, J. J.

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Smith, A. E.

Sydney—
Clack, J. F.

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Bruxelles—
Lagrange, D.

CANADA

Brantford—
Laing, A. C.

Galt—
Hastings, D.

Montreal—
Barry, A. M.
Royer, C.
Turnbull, A. S.

Toronto—
Bateman, H. I.
Beath, L.
Cave, J.
Fennell, R. J.
Hirt, E. L.
Todd, H. G.

Vancouver—
Scott, G. F.

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Thompson, G.

ENGLAND

Birmingham—
Hutton, R. S.

Brighton—
Goddard, B.

Durham—
Daly, M.

Hyde—
Adamson, D.

London—
Stephenson, A.
Tavenner, G. T.

Warrington—
Lloyd, H. D.

FRANCE

Neuilly—
Sarasin, R.

Paris—
Fouché, E.

GERMANY

Nowawes—
Fuechsel, M.

JAPAN

Hyogo-Ken—
Tamura, M.

Kiobashi—
Konishi, Y.

Kobe—
Ujiiye, T.

Tokio—
Haramiishi, M.
Huga, A.
Ito, K.
Nakasima, M.
Oyama, M.

MEXICO

Mexico, D. F.—
Easton, F. S.

NORWAY

Bergen—
Hansen, I.

Oslo—
Borsum, F.

SCOTLAND

Coatbridge—
Mitchell, J.

Renpew—
Steel, W.

SIBERIA

Vladivostok—
Dmitrieff, E. S.
Vologdin, V. P.

SOUTH AFRICA

Bononi, Transvaal—
Arnison, J. W.
Landmard, G.

SOUTH AMERICA

Chile—
Runge, C. F. W.

SWEDEN

Lidingo—
Kjellgren, J. G.

WEST AUSTRALIA

Midland Junction—
Marsh, H. H.

Sustaining Members

Products and Activities as Furnished by Each Company

Acetylene Journal, 53 West Jackson Boulevard, Chicago, Ill. Stuart Plumley, Managing Editor. A monthly magazine, now in its 27th volume, devoted to oxy-acetylene welding and cutting. Its articles are interesting, instructive and well illustrated; contributed to by men of experience in all branches of the industry. A request will bring you a sample copy, which will prove that the **Journal** should be a part of your equipment. Price, $2, United States and Canada; foreign, $3.

Air Reduction Sales Co., 342 Madison Avenue, New York, N. Y. Supplies. Airco high purity oxygen, Airco acetylene, Airco calorene, a homogeneous cutting gas, nitrogen, argon and other Airco atmospheric gases, Airco-National Carbide, Airco-Davis-Bournonville cutting and welding torches, pressure regulators and automatic welding and cutting machines, including the Oxygraph, Radiagraph, Camograph, Pyrograph, tube and barrel welding machines; acetylene generators, welding and cutting supplies. Every requirement for oxy-acetylene welding and cutting.

The American Brass Company, Waterbury, Conn. Manufactures a complete line of Anaconda Copper Alloy Welding Rods for oxy-acetylene and electric welding, including Tobin Bronze, Phosphor Bronze, Silicon Copper, Manganese Bronze, Ambrac and Muntz metal. Tobin Bronze (Registered U. S. Patent Office) is the most satisfactory material for general oxy-acetylene welding of cast iron, malleable iron and steel because of its uniform composition, free flowing qualities at 1650 deg. F. and high tensile strength. The low welding temperature required obviates shrinkage and frequently eliminates special preheating and dismantling.

American Bureau of Shipping, 50 Broad Street, New York, N. Y. President, C. A. McAllister. A society for the survey and registry of shipping, whose committees of management comprise the representative shipowners, underwriters, shipbuilders and marine engineers of the United States. The Bureau exists solely for the benefit of these various shipping interests, all accrued funds being used for its maintenance and the improvement of the service. The Bureau has a large corps of surveyors stationed at the various ports of the world. Welding for ships comes under its supervision.

American Chain Company, Inc., Bridgeport, Conn. Manufacturers of Weed Chains, Bumpers, Levelizers, Pliers, Tire Lock Chains, Towing Chains, Sling Chains, Campbell Cotter Pins. The largest makers of Welded and Weldless Chain in the world. The American Chain Company has developed chain making to its present state of perfection through the maintenance of an experimental division second to none, and ACCO Chain is accepted as standard in all lines of trade, and for every use for which chain is adaptable.

The American Rolling Mill Company, Middletown, Ohio. Manufactures Armco-Ingot Iron, the purest iron produced in commercial quantities today. The Page Steel & Wire Company, Pittsburgh, Pa., sole licensee for the manufacture of "Armco Page" electrodes and "Armco Page" gas welding wires, specialty products made from Armco-Ingot Iron, the scientifically degasified metal which conforms to rigid chemical specifications. Its homogeneity and freedom from detrimental impurities insures strong, durable welds.

Associated Oil Company, 79 New Montgomery Street, San Francisco, Cal. Producers, refiners and distributors of petroleum products. Manufacturers of "Cycol" lubricating oils and greases. Distributing facilities in California, Oregon, Washington, Nevada, Territory of Hawaii and Philippine Islands. Rail, steamer and pipe line transportation. Storage capacity, 24,294,300 barrels. Refining capacity, 75,000 barrels daily.

Bastian-Blessing Co., The, 240-258 East Ontario Street, Chicago, Ill. Manufacturers of Rego equipment for the oxy-acetylene and oxy-hydrogen process and all other gases used for welding, brazing and cutting; also complete line of equipment, consisting of fifteen different style torches and thirty-six different style regulators and ten different style acetylene

generators, including the only approved portable pressure generator on the market. Equipment is assembled in complete units designed to take care of work, from the most delicate jewelry and laboratory work to welding and cutting of heavy material. The company also manufactures equipment used in gas plants, such as cylinder valves, charging manifolds, special repair tools and testing apparatus.

Beall Pipe & Tank Corporation, Columbia Boulevard and Denver Avenue, Portland, Ore. Successors to Coast Culvert & Flume Company. Manufactures corrugated culvert, metal flume, electric welded pressure pipe, lock system gravity pipe, metal tanks for all purposes, irrigation and drainage gates, metal specialties.

Bethlehem Shipbuilding Corporation, Ltd., Bethlehem, Pa. Owns and operates ten plants equipped for building and repairing vessels of every description, from tugboats and submarines to the largest ocean liners and capital ships of the U. S. Navy. Manufactured products include boilers, engines and turbines; Diesel oil engines; deck and engine-room auxiliary machinery; power-plant equipment, including condensers, feed heaters, evaporators, pump for all service, fuel oil-burning systems; Bethlehem-Amdyco fire extinguishing system and equipment for the extraction of paraffine wax from crude oil.

Bethlehem Steel Company, Inc., Bethlehem, Pa. This company owns and operates seven steel-producing plants, which are located at Bethlehem, Pa., Johnstown, Pa., Coatesville, Pa., Lackawanna, N. Y., Lebanon, Pa., Sparrows Point, Md., and Steelton, Pa. Products range all the way from pig iron and other blast-furnace products to finished machinery of exceptional size and capacity. The raw materials used in the making of Bethlehem iron and steel are obtained from mines and quarries owned by the company, which has the important advantage of making it possible to select the materials going into the various products of all plants.

Edward G. Budd Manufacturing Company, Twenty-fifth Street and Hunting Park Avenue, Philadelphia, Pa. Manufacturers of "ALL-STEEL" automobile bodies and steel units for open and closed cars. The various units are welded in sub-assembly jigs, then put in the complete assembly jigs and welded together, forming a single steel unit. Welds eliminate loose joints, rattles and squeaks. The all-steel construction results in considerable saving in weight, increased strength, and 60 per cent increase in driving vision in closed cars due to narrower windshield posts made possible by use of steel.

Burke Electric Company, Erie, Pa. Company manufactures direct and alternating current dynamos and motors, high-tension molded products and special switchboard fittings; variable voltage type welding generators in single and two operator types, requiring no exciter, in which all regulation of current is accomplished by turning hand wheel which moves the brushes giving "Micrometer current adjustment." Constant potential type equipments are also manufactured with portable controllers or stationary panels for multiple operator metallic arc welding or with panels arranged for carbon welding and cutting.

The Capital Traction Co., Thirty-sixth and M Streets, Washington, D. C. Company operates over 73.98 miles of track. Three electric welding outfits are used for maintenance and construction work, and some work is also done with the oxy-acetylene and thermit processes. Repair shops are equipped to do welding repairs to car equipment, sub-station and power-station equipment and on track. Five welders are constantly busy on this work. Rail joints are all welded when new track is installed.

Carbic Manufacturing Co., Duluth, Minn. This company's principal product is Carbic, a briquetted carbide, which is used exclusively in Carbic, portable, acetylene generators for welding and cutting, and also in Carbic, powerful, portable, acetylene lights used by contractors, railroads and others for night illumination. In addition to carbide, company manufactures welding and cutting torches, welding heads, cutting nozzles, carbon and lead burning torches and tips, welding and cutting supplies and equipment and portable flare lights.

W. A. Case & Son Mfg. Co., 220 Delaware Avenue, Buffalo, N. Y. Company was founded in 1853, with headquarters at Buffalo, N. Y., the boiler and

tank factory being located at Norristown, Pa., and the products of which plant are sold with country-wide distribution through the regular trade channels. The oxy-acetylene welded products manufactured by the company are range boilers and expansion, storage, pneumatic, gasoline and air tanks.

Central Steel & Wire Company, 4545 So. Western Boulevard, Chicago, Ill., and 5001 Bellevue Avenue, Detroit, Mich. This firm has been producing welding wire for over fifteen years, and carries a great diversity of wires and rods, both ferrous and non-ferrous, as listed in the advertising section of this issue. They specialize in the solution of special welding problems and encourage the trade to patronize their Service Bureau, which is maintained without charge for this purpose.

Chicago Bridge & Iron Works, 37 West Van Buren Street, Chicago, Ill. The Chicago Bridge & Iron Works regularly employ welding processes throughout many details essential to the fabrication of tanks and plate work, pipe connections, manhole hatches and covers, base plates for small columns and numerous other details. In field work, bottoms and roofs of oil storage tanks of all sizes are welded throughout, shell plates of small tanks are welded. It is also used for numerous other details, such as attaching shell plates to the bottom angle, etc.

Chicago Steel & Wire Company, 103rd Street and Torrence Avenue, Chicago, Ill. Manufacturers of WELDITE Welding Rods and of Green-Surfaced Electrodes. The WELDITE line includes a low carbon rod, copper coated for gas welding, meeting specifications of Welding Society G No. 1A, a pure iron and a mild steel rod for electric welding furnished either Black Soft, Bare Bright, Green Surfaced or Flux Coated, corresponding respectively to Welding Society's specifications E31A and E No. 1B. Also a 3½ per cent Nickel Rod for gas welding and High Carbon and Chrome Vanadium Rods for both gas and electric welding.

Commercial Acetylene Supply Co., Inc., 80 Broadway, New York, N. Y. Company manufactures acetylene, acetylene cylinders, acetylene plant equipment (complete or in parts), and acetylene generators. Equipped to give prompt and efficient service on any quantity of acetylene through plants, warehouses and truck deliveries.

Electric Arc Cutting and Welding Co., 152-156 Jelliff Avenue, Newark, N. J. The company has in stock every facility for arc welding and cutting. Prompt delivery on transformer welders, generator sets and all accessories. Features "universal" power supply apparatus. ALTERNARC machine can be made to operate from any power supply, and their generator gives both direct and alternating current, so that either Direct Arc or Alternating Current Arc, Spot, Butt or Seam Welders can be operated therefrom. Important and extraordinary welding, repair or structural contracts are entered into in any part of the world.

Frick Company, Waynesboro, Pa. This company builds ice-making and refrigerating machinery and equipment, and uses electric and oxy-acetylene welding in making various parts of refrigerating systems. Pressure vessels, such as ammonia receivers, oil separators, accumulators, condensers and brine coolers are all of welded construction. Also, continuous pipe coils, headers and bends are welded. Use welding for tanks, pans and for repairing castings, and are interested in the art in all its phases, as it is indispensable in above classes of work, also do forge welding.

General Boilers Co., Waukegan, Ill. Pacific Steel Heating Boilers are built for steam or hot water in both the smokeless and direct draft types for operation on coal, oil, gas or wood. Built of steel plate with all seams and joints electrically welded, the Pacific is as nearly indestructibe as it is possible to build a boiler. Pacific Boilers are built to the ASME Boiler Code and require from 25 per cent to 40 per cent less floor space than ordinary steel boilers.

General Electric Co., General Offices, Schenectady, N. Y. Manufactures various sizes and types of direct current arc welding equipment. Constant energy, single operator generators arranged for belt drive, or for direct connection to electric motors or gas engines. Resistor type arc welders. Automatic arc welders which maintain constant arc length

and welding temperature, including complete machines for tank or pipe welding. Semi-automatic arc welders, which combine automatic welding head with flexible guide and welding tool, held by operator. Constant potential generators, single or multi-operator, direct connected to standard electric motors.

General Welding and Equipment Co., 74 Brookline Avenue, Boston, Mass. Manufacturers of welding and cutting equipments. Regulators of the double diaphragm type with forcibly guided movement. Originators of the goose-neck welding torches, pioneers in heavy cutting apparatus. Highest grade welding supplies; filler rods, hose, goggles and fluxes. Designers of automatic shape cutting machines up to sizes never attempted before, able to cut heavy connecting rods and whole locomotive frames with one single setting. Circle cutting machines, shaft cutting machines, straight line cutting machines.

C. H. Hollup Corporation, 3333 West Forty-eighth Place, Chicago, Ill. Rex-surfaced processed electrodes—a semi-coated wire at bare wire prices. If you would like to try a bare electrode which has the uniform smooth flowing qualities of a coated electrode, send for free samples. Furnished in pure iron (Rex No. 10) and mild steel (Rex No. 30). Sizes 3/32 in., ⅛ in., 5/32 in., 3/16 in. and ¼ in. Manufacturers of Wanamaker coated electrodes.

International Acetylene Association, 30 East Forty-second Street, New York, N. Y. The association embraces in its membership manufacturers of calcium carbide, manufacturers of acetylene generators and appliances used in the consumption of acetylene, manufacturers of dissolved acetylene, manufacturers of oxygen, and those interested in the use of acetylene. The membership is made up of company and individual membership. The purposes of the association are the encouragement of the use of acetylene, its related gases and apparatus. It cooperates with all regulatory bodies in the development of standards and rules intended to safeguard the industry without unduly restricting it.

International Engineering Works, Inc., Framingham, Mass. Manufacturers of high pressure steam boilers, special plate work for paper, textile, chemical, rubber, slaughtering and rendering industries. Main office and works at Framingham, Mass.

K-G Welding and Cutting Co., Home Office and Factory, 556 West Thirty-fourth Street, New York, N. Y. Manufacturers of and dealers in gas welding and cutting equipment and supplies. Distributors and Service Stations in New England, Baltimore, Chicago, Staten Island, Albany, Philadelphia, Montreal, Toronto, Indianapolis, Detroit, Perth Amboy, West Alexandria (Ohio), Pittsburgh, Clifton, and Paterson, N. J.

Lincoln Electric Co., Cleveland, Ohio. Company manufactures induction motors from 1 hp. to 250 hp. Manufactures elevator motors in which the torque per ampere of current supply is exceptionally high, and 200, 300, 400 and 600 ampere welding machines which have drooping characteristics requiring no resistance in series with the arc. Also manufactures automatic carbon arc welding machines for production work which has welding speeds as high as 75 or 100 feet per hour on some classes of work.

Linde Air Products Co., 30 East Forty-second Street, New York, N. Y. Starting with the process that first separated oxygen from the other elements in the air on a large scale, the Linde organization has developed commercially until it now operates a national chain of 37 plants and 106 warehouses. Along with this remarkable growth in size has grown up a thoroughly technical and practical service to its customers in the use of Linde products.

Metal and Thermit Corporation, 120 Broadway, New York. The Metal and Thermit Corporation manufactures thermit for use in welding rails, compromise joints, special work for street railway companies, locomotive frames, yokes and other heavy sections for steam railroads, as well as such sections as crank shafts, stern frames of ships and for the welding of all types of heavy sections, and also for butt welding of pipes up to 6 inches in diameter. The Metal and Thermit Corporation also manufactures the necessary accessories and furnishes molding sand, crucibles, preheaters and other equipment necessary for this type of work.

Alexander Milburn Company, 1416 W. Baltimore Street, Baltimore, Md. Manufactures a complete line of welding and cutting apparatus, including: Acetylene medium pressure generators, 30 to 500 lb. capacity; acetylene generating and compressing plants, industrial and commercial types up to 1000 lb. capacity; welding torches and cutting torches; combination cutting and welding torches operated by merely changing the tips; special torches, made to order; regulators for regulating delivery of gases up to 3000 lb.; preheaters and oil burners; manifolds for oxygen acetylene, or other gases; accessories, paint guns and sprays.

New Orleans Public Service, Inc., 201 Baronne Street, New Orleans, La. Company does a general lighting and power business in addition to maintaining a street railway system. It operates 224 miles of track and has 625 motor passenger cars, 42 trail passenger cars, 1 motor freight, 42 motor service and 30 trail service cars. President, H. B. Flowers.

Northwestern Electric Company, Pittock Block, Portland, Ore. Supplies electric light and power and steam-heat services in Portland, Ore. Electric service supplied also in Camas, Kalama, Ridgefield, Vancouver, Washougal and Woodland, Wash., and Rainier, Ore.

Oxweld Acetylene Co., 30 East Forty-second Street, New York, N. Y. Under the trade names of Oxweld and Prestoweld, this company manufactures a complete line of apparatus and supplies which make possible real efficiency of oxy-acetylene welding and cutting. From the acetylene generator to the welding and cutting blowpipe, special analysis welding rod and flux, the Oxweld Acetylene Company's products are the result of thorough research. Engineers and trained operators are maintained in all district offices to instruct in and extend the use of oxy-acetylene welding and cutting.

Page Steel & Wire Company, General Offices, Bridgeport, Conn. Manufacturers of Page Armco and Steel Electrodes or Gas Welding Wire. Welding wire conforms to A. W. S. specifications and are especially processed for the type of welding for which they are recommended. Also manufacturers of guy strand, signal track bands, all commercial high and low carbon, plain or galvanized wire, special analysis wire and hot rolled rods. Fence for factory, farm or lawn. Woven wire Hi-Way Guard—Page Panel Partitions.

The Petroleum Iron Works Company, Sharon, Pa. Fabricators and erectors of tanks of all kinds and sizes; oil refinery equipment; welded pressure and vacuum stills; welded pressure pipe, and all classes of light and heavy steel plate construction, welded or riveted. Steel plate plants at Sharon, Pa., and Kansas City, Kan. Also manufacturers of welded steel shipping bilged barrels and straight-side drums for liquids, semi-liquids and solids. Barrel and drum plants at Sharon, Pa., and Beaumont, Tex.

Portland Electric Power Company, 329 Alder Street, Portland, Ore. Carries on a general business of electric light and power generation and distribution. Hydro-generating capacity, 105,500 hp.; steam, 76,000 hp. Serves 67 cities and communities in Oregon and Washington, principally the city of Portland and the Willamette Valley in Oregon. Population served, 400,000. Company serves and operates Portland City Street Railway System and four interurban lines. Thirty modern gas and gas-electric buses operated in conjunction with City and Interurban Railway System.

Portland Oxygen & Hydrogen Company, The, 596 Sherlock Avenue, Portland, Ore. Producers of not less than 99.5 per cent pure oxygen and 99.9 per cent pure hydrogen. Distributors of Purox acetylene, Purox welding and cutting apparatus, welding rods and supplies—everything for gas welding and cutting.

Pressed Steel Tank Co., Milwaukee, Wis. Manufacturers of seamless drawn steel acetylene cylinders since the beginning of the compressed acetylene industry. Seamless steel bilged barrels with full removable head suitable for shipping 500 lb. of carbide, also seamless steel barrels for shipment of oils and gasoline. Drums with removable cover made in two sizes, 500 and 1000 lb. for shipping or storing carbide, and meeting all Interstate Commerce requirements. Seamless drawn steel tanks for high or low pressures.

Prest-O-Lite Co., The, Inc., 30 East Forty-second Street, New York, N. Y. With a manufacturing and distribution system of the greatest flexibility, this company has proved itself indispensable to welding. It has contributed to the oxy-acetylene welding industry a marketing service of Prest-O-Lite acetylene and returnable steel cylinders which is unexcelled. The manufacture of Prest-O-Lite is carried on in thirty-one plants which stock eighty-four warehouses in industrial centers throughout the country. In cylinders of convenient capacities, Prest-O-Lite is used wherever portable supplies of acetylene are required.

Reid-Avery Company, Twenty-first and Washington Avenue, Philadelphia, Pa. Manufactures medium carbon, low carbon mild steel, and covered electrodes for electric welding. Also rods for oxy-acetylene welding in plain and copper coated finish. All "Raco" welding wires are guaranteed to meet the American Welding Society Specifications in every particular.

J. A. Roebling's Sons Co., Trenton, N. J. Manufacturers of welding wire, high or low carbon or high manganese steel, bronze, brass or copper for electric or gas welding. Manufacturers of wire rope, wire rope slings for heavy or light duty, bare or insulated copper wires and cables. Engineering data and catalogs sent on application.

Standard Oil Company, San Francisco, Cal. Welding is extensively used in both construction and maintenance work by all the operating departments of this company.

Third Avenue Railway System, 130th Street and Third Avenue, New York. The Third Avenue Railway System operates 300 miles of trolley lines in New York City and municipalities north of it, carrying 350 million passengers annually. Welding by electric arc, gas and thermit processes is extensively used in its shops and on its tracks. It regards the work of the American Welding Society as of great value to the Electric Railway industry, and it carries membership in the Society for its employees in charge of welding work.

Thomson Electric Welding Co., Lynn, Mass. Manufacturers of butt welders—capacity from 28 gage iron or steel wire to rods or other shapes 30 in. square cross section, also used for brass and copper. Spot welders—capacity two pieces 28 gage steel or iron to two pieces ½ in. total thickness; will also weld brass, tin, galvanized iron or aluminum. Seam welders used for making air or watertight seams, stock, iron or steel not over 14 gage; also used for seam welding brass.

Torchweld Equipment Co., Fulton and Carpenter Streets, Chicago, Ill. Manufacturers and distributors of the Torchweld line of gas welding and cutting equipment, which includes Torchweld non-flash welding torches, Torchweld stay-lit cutting torches, Torchweld positive gas pressure regulators, Torchweld non-flash lead burning and brazing torches, Torchweld accessories and supplies. Every requirement of gas welding and cutting industry is covered by the Torchweld line. All Torchweld torches have incorporated in their design the exclusive patented Torchweld non-flash construction.

Una Welding & Bonding Co., Cleveland, Ohio. Manufacturers of Una Welders (Dynamotor Type) for general welding purposes, both carbon and metal electrode, single and double operator. The light weight, compact yet sturdy construction and convenient mounting of these welders make them particularly well suited for both general shop welding and outside construction work. Una seam welded rail joints, Una direct copper to steel welded bonds, Una electrodes for all classes of electric welding. A research department is maintained for study of special welding problems.

The Union Carbide & Carbon Research Laboratories, Thompson Avenue and Manley Street, Long Island City, N. Y., were organized to carry out research work for the Union Carbide and Carbon Corporation and its subsidiaries. Among their activities is work on oxy-acetylene welding and cutting processes. A staff of chemists and metallurgists conduct investigations leading to the improvement of present methods and the discovery of new ones, this being carried out in conjunction with the Linde Air Products Company, the Prest-O-Lite Company, Inc., Oxweld Acetylene Company, and the Union Carbide Sales Company.

Union Carbide Sales Company, 30 East Forty-second Street, New York, N. Y. About thirty-two years ago an effort to produce metallic calcium in an

electric furnace resulted in the production of calcium carbide instead. Union Carbide Company pioneered and developed the production of calcium carbide of high purity. Union Carbide Sales Company, through its remarkable distributing system, now consisting of more than 175 warehouses in as many different cities, has made Union Carbide easily available everywhere. They supply Union Carbide in generator sizes direct to the consumer.

United States Gauge Company, 44 Beaver Street, New York. The company has specialized in the production of Bourdon tube pressure gages which will meet the severe service demands of this industry. Briefly summarized, these are: First—Safety to the operator. Second—Lightness and sensitiveness of mechanism, at the same time preserving the requisite strength and wearing qualities of the moving parts. Third—Complete control of the incoming gases, so as to eliminate sudden strains on the tube itself. Fourth—Thoroughly seasoned tubes, thereby eliminating false registration.

U. S. Light and Heat Corporation, Niagara Falls, N. Y. Manufacturers of USL electric arc welders, single operator, variable voltage type in both 200 and 300 ampere capacities for continuous service. Manufactured with DC or AC motor for all commercial voltages and frequencies, gasoline engine or belt drive, portable, semi-portable and stationary types. USL storage batteries for automobiles, radio, railroad car lighting, farm lighting and signal service.

Welding Engineer, 608 South Dearborn Street, Chicago, Ill. H. S. Card, managing editor. The welding engineer is an accurate source of information and advisor on every phase of welding. Both manufacturing and repair problems by every process of welding is discussed fully in this valuable monthly publication. In your plant there is a man who needs timely and accurate information about welding. He should know what is being done in other plants to reduce costs and increase efficiency. Write for sample copy. Price, $3 in the United States and Canada; $4 abroad.

Western Pipe & Steel Company of California, 444 Market Street, San Francisco, Cal.; 5717 Santa Fe Avenue, Los Angeles, Cal. Fabricators, designers and erectors of oil storage tanks, brine tanks, bolted tanks, galvanized tanks, surface pipe, corr. galv. culverts, gas holders, gas generators, smoke stack, welded steel pipe, oil well housings, well casing, penstocks, refuse burners, oil refinery equipment, dredge pipe, standpipes, structural steel, tunnel lagging, boilers, truck tanks, pressed steel work, air receivers, hydro-pneumatic tanks, gasoline and lubricating oil tanks, and ice cans.

Westinghouse Air Brake Co., Wilmerding, Pa. Manufacturers of Air Brake Apparatus for Steam and Electic Railways, Brakes for Automotive Vehicles, also Air Compressors, Reservoirs and related Apparatus for Railways and general industrial use.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Manufactures a 200 ampere portable or stationary welding motor generator outfit which delivers 60 to 300 amperes in 61 steps. Multiple operator arc welding equipments of 300, 500, 750 or 1000 amperes capacity can be furnished for metal or carbon welding or cutting. Arc welding rheostats for operation from mine and electric railway trolley circuits are manufactured. Also manufactures an automatic arc welding machine, which will operate satisfactorily from any of the above welding motor generator sets.

Wilson Welder & Metals Co., Wilson Building, Hoboken, N. J. Wilson Welding Machines consist of motor generator, gasoline engine driven and belt driven types, and have a capacity of from 25 to 250 amperes. Wilson "Color-Tipt" Welding Wire is manufactured in various grades and diameters for welding steel, cast iron, malleable iron, brass, bronze, copper, Monel metal and aluminum.

York Manufacturing Company, York, Pa. This company builds ammonia compression, ammonia absorption and CO_2 ice making and refrigerating machinery. Also manufactures a complete line of ammonia and CO_2 valves, fittings and auxiliary equipment for complete ice making and refrigerating plants. These products include a great variety of pressure vessels and piping, in the fabrication of which welding is employed extensively.

Classified List of Advertisers

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Air Reduction Sales Co.
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Acetylene Welding Generators
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Metal and Thermit Corporation.

Aluminum Solder
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Automatic Welding Machines (Gas)
Air Reduction Sales Co.
Oxweld Acetylene Co.
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Blowpipes
Air Reduction Sales Co.
Bastian-Blessing Company.
International Oxygen Company.
Alexander Milburn Company.
Modern Engineering Company.
Oxweld Acetylene Company.
Torchweld Equipment Company.

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J. A. Roebling's Sons Co.
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National Carbon Co., Inc.

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Torchweld Equipment Co.

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Page Steel & Wire Co.
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Our Welding Carbon Products are designed especially for welding operations

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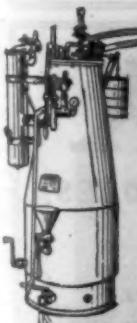

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Torches
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Catalog 547

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Its acceptance as standard equipment by large industrials, railroads and Government Departments the world over exemplifies Milburn leadership.

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UNA Welding offers not only Speed and Economy in joining metals, but also the necessary strength, toughness and ductility of the weld metal.

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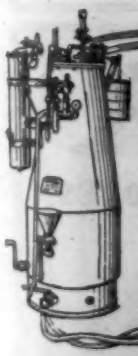

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During the past 15 years the Pressed Steel Tank Company has manufactured 70,000 Hackney acetylene cylinders. Of this number 69,800 or 99 7/10% are in active service today.

Records show that all of the 200 which are now out of service were destroyed by fire or some other external force. Only two actually ruptured and these split longitudinally in the shell without fragments.

This is another proof of the reliability of the oxy-acetylene welding process used in the production of Hackney acetylene cylinders.

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Select the Wilson Welding Machine that Meets Your Own Operating Conditions

With its simple construction, close regulation, rugged strength — *superior engineering throughout* — the Wilson Type S has proved itself a *better welding machine.* Its features—many of which are found in no other machine—make the Wilson Type S the choice for practically every kind of welding. And there is a Wilson Type S Machine for every operating condition — a Single-Operator Motor Driven Electric Welding Machine, capacity 25 to 250 amperes; Single-Operator Gasoline-Engine-Driven Electric Welding Machines, capacity 25 to 200 and 250 amperes; Single-Operator Stationary Belt-Driven Electric Welding Machine, capacity 25 to 250 amperes; Two-Operator Stationary Motor-Driven Electric Welding Machine, capacity 25 to 500 amperes. Select the Wilson welding machine that meets your own operating conditions, and write today for full information and prices.

Type S Features

Every Wilson Type S Machine has a simple, compact control panel; a *self-exciting* generator; an arc that is easy to strike and easy to maintain; a current adjustment by a simple turning of a field rheostat; a commutator that always shows *less temperature rise than any other part of the machine.* The welding current can be reduced to as low as 25 amperes for welding thin-gauge metals, maintaining a very stable arc in spite of the low current.

WILSON WELDER & METALS CO. INC., WILSON BLDG., HOBOKEN, NEW JERSEY

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WELDING MACHINES AND WELDING WIRE

Welding
ROEBLING
Wire

conforms to the specifications of the American Welding Society. Exacting tests have proven that it possesses those qualities essential to good welding.

John A. Roebling's Sons Company
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The man who pays the bills is seconded in his enthusiasm for

SHAWINIGAN CARBIDE

by the expert acetylene workers themselves. They are both welded to the kind they know gives

"More Gas per Pound"—

SHAWINIGAN PRODUCTS CORPORATION · 110 WILLIAM ST. N.Y.C.

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Processed Welding Wire and Electrodes

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Welding Wire *and* Electrodes

stop lost time

Wire that's *processed* after drawing makes it easier for your welder to turn out uniform work—it stops lost time and ruined work.

In addition, Page Welding Wire is *shop tested*, proved by actual tests on all types of welding problems. Let us show how you can weld more efficiently at less cost.

Large stocks carried at convenient shipping points by our distributors who are giving a nation-wide service. Write for sample wire and interesting information about welding—no obligation. Put your welding on a paying basis.

Page-Armco Welding Wire and Electrodes are shop tested and processed after drawing

PAGE STEEL AND WIRE COMPANY

An Associate Company of the American Chain Co., Inc.

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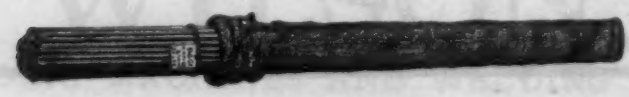
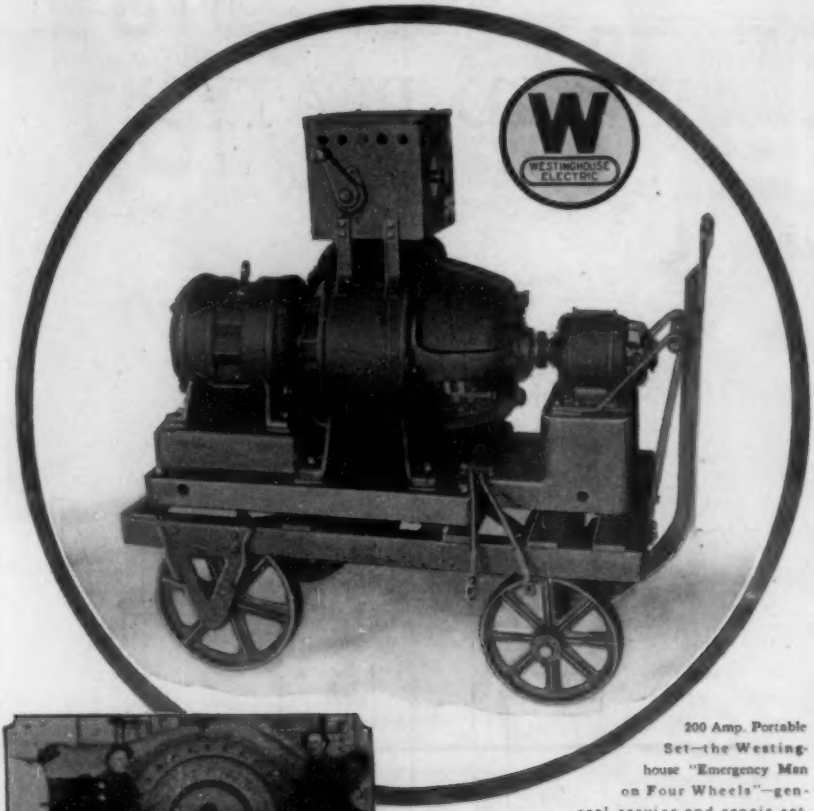
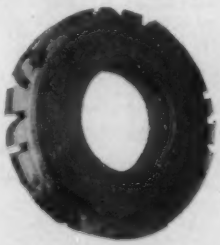
District Offices: Chicago, New York, Pittsburgh, San Francisco.





200 Amp. Portable Set—the Westinghouse "Emergency Man on Four Wheels"—general service and repair set.

Parker Young Company, Lincoln, N.H., repaired this waterwheel casing of a paper machine at a cost of $200. A new casing would have cost $1000.



This cast iron tire mould was repaired by electric welding, replaced in service, and wore three times as long as the average new mould.

It Can Be Welded

Electrically!

THE ever-widening circle of arc-welding applications involves new fields and greater possibilities every day. For every application, in production or repair work, there is a Westinghouse set that will serve best—designed to meet special conditions and built to Westinghouse standards of durability and efficiency.

Westinghouse Electric & Mfg. Company
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Sales Offices in All Principal Cities of the United States and Foreign Countries

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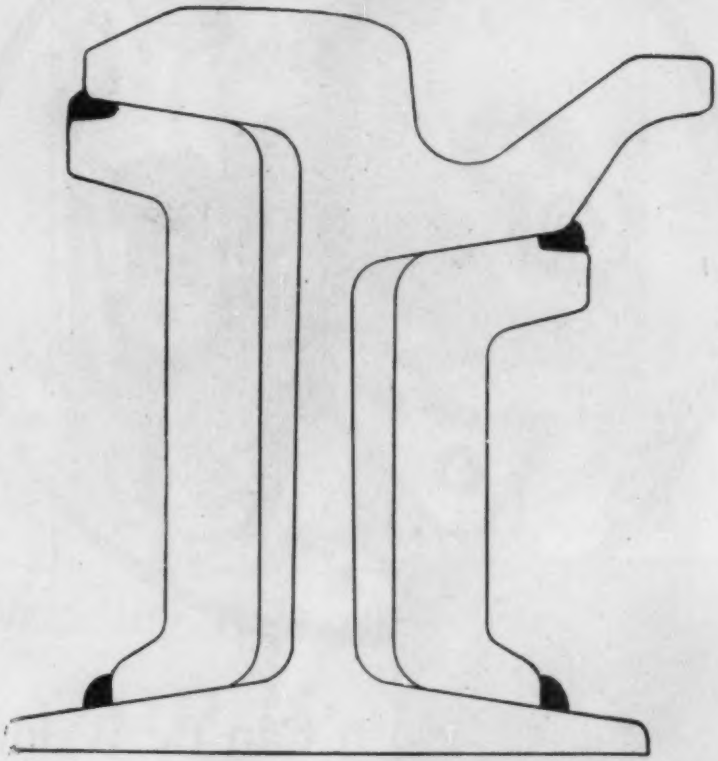

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All you need is a trial to show that our patented "WELD PLATES" make the most efficient and economical of bar-weld joints.

Because they are the strongest and most up-to-date plates rolled especially for electric welded joints. Note the shape—the grooves for retaining plenty of weld metal along the upper edges—the wide contact areas at top and bottom—the suitability for the use of short bolts.

Many of them in successful use.

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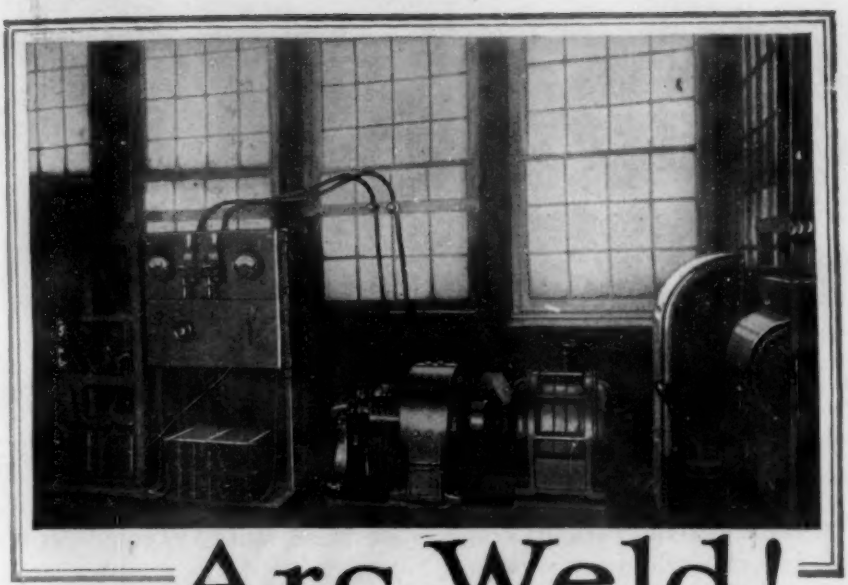
165 Broadway, **New York, N. Y.**



Arc Weld!

4 welders work from this one machine. It is a G-E Constant Potential Welding set installed at the plant of the Coshocton Iron Co., Monongahela, Pa. If this set were not used, 4 individual welding sets would have to be purchased; 4 individual welding sets would have to be maintained.

G-E Constant Potential sets are compact, highly efficient "central stations" for welding on a large scale. They save the price of a large number of individual welders. Because there are fewer brushes, fewer bearings, and fewer rotating parts, their maintenance is far less than that of the welders they replace. Investigate these multiple-operator welders whenever you plan quantity welding.

G-E welding specialists will help you choose the welding equipment best suited for your needs. Write to your nearest G-E office.

General Electric furnishes to the Welding Industry:

WD Arc Welders—designed for one operator

Constant Potential Sets—for several operators

Arc Welding Resistors—for mining and traction companies

Automatic Sets—for repetition work

Bulletins on every type available at your nearest G-E office.

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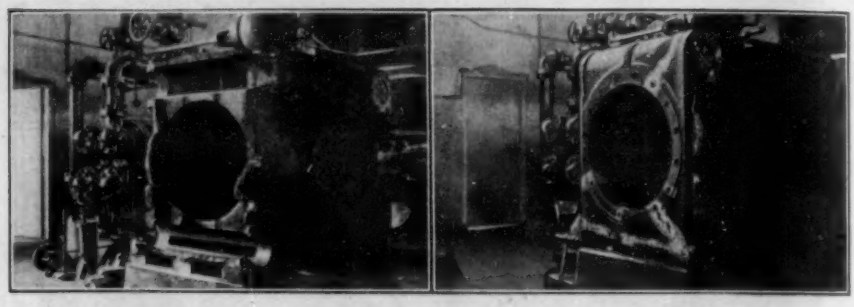
GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK



How a badly broken Corliss engine cylinder was repaired quickly and permanently

THE entire head end of a high pressure cylinder was broken off on a line through the center of the steam-valve chamber, the cylinder proper and the exhaust valve chamber.

Five welders worked in shifts, using the oxy-acetylene process and Tobin Bronze Welding Rods. The actual welding time was 21 hours, with a total of 63 man-hours.

The materials required were 216 pounds of ¼-inch Tobin Bronze Welding Rods; 5½ pounds of welding flux; 1270 cubic feet of acetylene, and 1339 cubic feet of oxygen.

Ordinarily, the use of Tobin Bronze eliminates the need of extensive preheating. In this case the masses of metal were so great that a preliminary heating was considered necessary.

After all work was done, a cold water test of 170 pounds per square inch gave no sign of a leak and the engine was put back into service. A new cylinder would have cost $1200. The total cost of the repair job with Tobin Bronze was one-half that amount.

THE AMERICAN BRASS COMPANY
GENERAL OFFICES: WATERBURY, CONNECTICUT
Canadian Mill: Anaconda American Brass Ltd., New Toronto, Ont.

TOBIN BRONZE
REGISTERED U.S. PATENT OFFICE
WELDING RODS

Before you settle on the type of machine— get the users viewpoint

Any Lincoln office below will put you in touch with a user near you whose experience covers many types of welders. Get his viewpoint based on experience.

They say

(a new list in each issue)

"The fact that this is our third order indicates how strongly we lean toward the Lincoln machine."

* * *

"The welder we purchased from you three years ago has been in regular service since then and we must say that this service has been excellent."

* * *

"Both machines that we bought are performing nicely and are entirely satisfactory in every respect."

* * *

"The Lincoln welders have been in the hands of various workers from time to time and I have yet to hear of any complaint from them."

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"You will probably be interested to know that our company has now standardized on the Lincoln machines."

"Stable Arc"

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The Lincoln Electric Co. of Canada, Ltd., Toronto-Montreal
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UNION CARBIDE

World's Best Quality - Highest Gas Yield
Always Uniform - Always Dependable

Packed in Blue and Gray Drums

We have Warehouses in 175 Cities

The product of the originators and developers of the carbide and acetylene industry

QUALITY assured by more than a quarter of a century of experience in selecting raw materials and in perfecting laboratory practice and works processes.

The faithfully sustained quality compels recognition of the economies which go with it.

Union Carbide will keep for years in the original package without deterioration.

Our remarkable nation-wide service and distributing system makes Union Carbide quickly available everywhere.

There is a Union Carbide warehouse near you. Shipment is made same day your order is received.

We supply Union Carbide in Generator sizes—direct to consumer—at factory prices.

Our Blue and Gray Drum is recognized throughout the world, as a symbol denoting Best Grade Carbide, Highest Gas Value, Uniform Dependable Quality and Purest Gas.

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WHY Linde leads

LINDE'S position as the world's largest producer of oxygen isn't just an accident.

Chance does not build 37 plants nor does it establish for the convenience of users of oxygen everywhere more than 100 warehouses so located that no matter where your plant or shop is situated you are near a Linde source of supply.

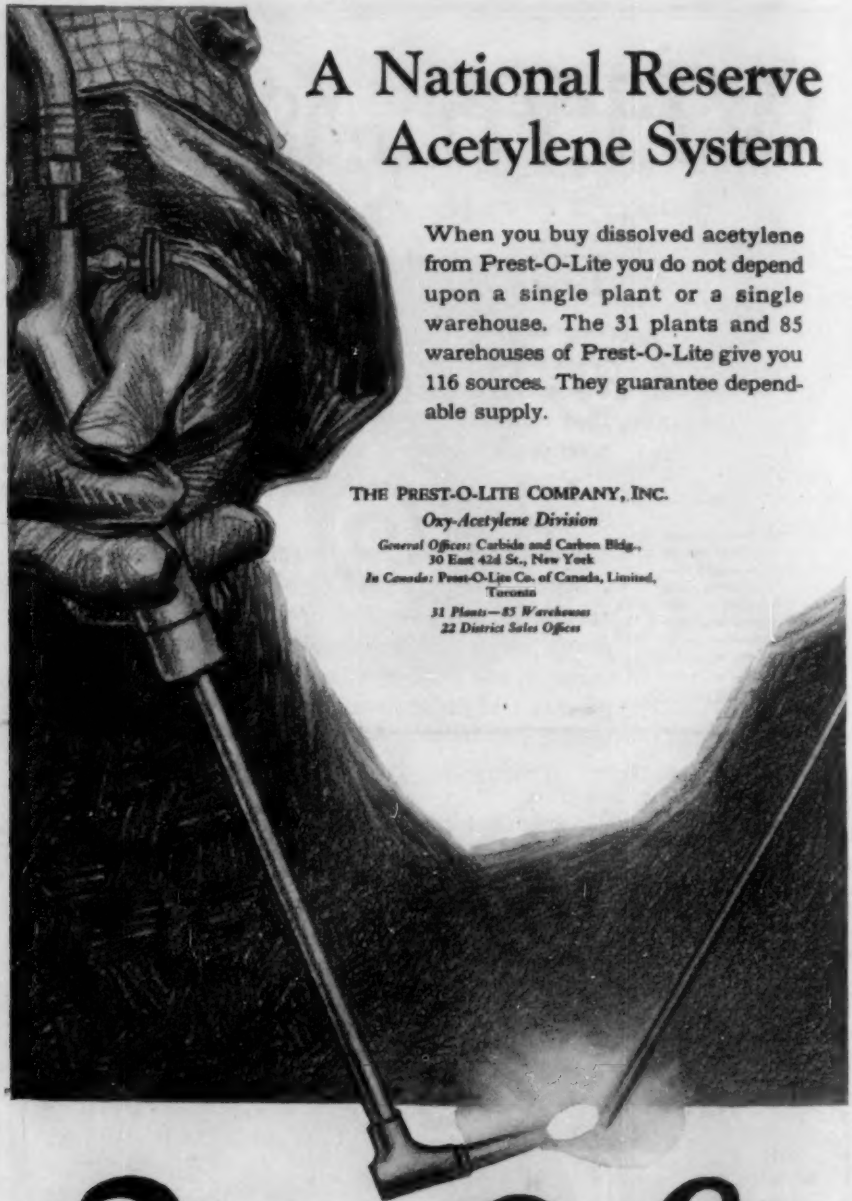
Another reason for Linde's leadership is Linde Service.

For years the Linde service organization has studied and perfected applications of the oxy-acetylene process. The results of this development work are made available to customers through our field service staff of welders and engineers and through our publication—Oxy-Acetylene Tips.

THERE has been no more general application of "Safety First" principles than in the use of gear and machine guards. Constructed of angle irons and covered with wire netting, perforated metal or, if protection from oil is desired, with light sheet metal, they can be fabricated by oxy-acetylene welding and cutting. Linde Methods will tell you how to do the job most economically.

THE LINDE AIR PRODUCTS COMPANY
Manufacturers of oxygen, nitrogen, pyrogen, argon and neon
Producers of helium for scientific purposes
GENERAL OFFICES
Carbide and Carbon Building, 30 East 42d Street, New York
37 PLANTS—105 WAREHOUSES

LINDE OXYGEN



A National Reserve Acetylene System

When you buy dissolved acetylene from Prest-O-Lite you do not depend upon a single plant or a single warehouse. The 31 plants and 85 warehouses of Prest-O-Lite give you 116 sources. They guarantee dependable supply.

THE PREST-O-LITE COMPANY, INC.
Oxy-Acetylene Division
General Offices: Carbide and Carbon Bldg., 30 East 42d St., New York
In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto
31 Plants—85 Warehouses
22 District Sales Offices

Prest-O-Lite
DISSOLVED ACETYLENE

Why Oxweld built the R-27 regulator

MAKE IT SIMPLE! So experience speaks to every manufacturer of equipment and appliances for industrial use. Nowadays quality alone is not enough. Workmen lose valuable time with complicated devices.

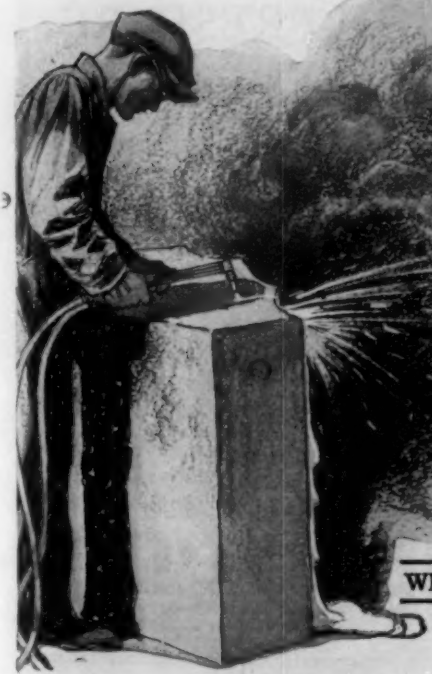
The Oxweld R-27 regulator is made of 23 parts. It is doing the same work that the older regulators did with 33 parts. Its success is due to a combination of simple design, rugged construction and careful workmanship.

Do you know that any part of the Oxweld R-27 regulator can be completely replaced in less time than is needed to take apart older regulators? A minor point, to be sure, for replacements are seldom necessary, but it illustrates the simplicity of construction.

The Oxweld R-27 is not a nozzle type regulator. It has exceptional flow capacity for this reason and will work without freezing. Several years of service in both high and low temperatures have shown it to be simple, sturdy and reliably accurate.

OXWELD ACETYLENE COMPANY

CHICAGO 3642 Jasper Place
LONG ISLAND CITY, N. Y. Thompson Ave. & Orton St.
SAN FRANCISCO 1090 Mission Street



Oxweld

WELDING AND CUTTING APPARATUS

Electric Arc Welding Equipment

Transformer Arc Welders (A. C.)

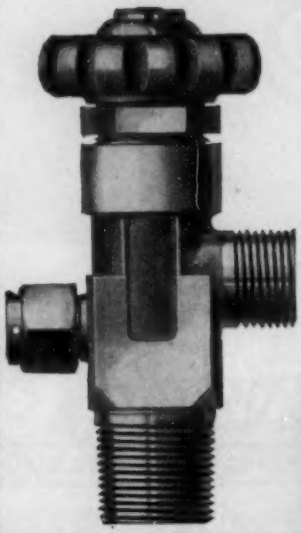
Motor Generator Sets (Direct Current)

Gasoline Engine Generator Sets (D. C.)

A complete line of Electric Welding Accessories always carried on hand.
Electrodes—Holders—Masks—Handshields—Glasses—Cables, etc., etc.

ALLAN MANUFACTURING & WELDING CO., Inc.
726 WASHINGTON STREET BUFFALO, NEW YORK

SHERWOOD HIGH-PRESSURE CYLINDER VALVES



for oxygen, hydrogen, carbon dioxide, argon, helium, etc.

THESE valves open easily, close tightly and have four times ordinary strength. No sticking or distortion of internal parts. Made in the light of 27-year experience and have given 20 years of constant service. Over 75 per cent of sales are on repeat orders. Write for Bulletin 11.

Sherwood Manufacturing Company
1701 Elmwood Ave. Buffalo, N. Y.

SHERWOOD
A GOOD NAME TO REMEMBER WHEN BUYING POWER PLANT and INDUSTRIAL SPECIALTIES

Thermit Takes the Guess Out of Welding

THERMIT welding is dependable. The operation is exceedingly simple. The experienced operator, therefore, knowing that he has followed the proper procedure can be certain that his results will be uniformly good. In addition to that, however, it is a very simple matter to determine the quality of a Thermit weld. In this respect the process is unique. It is only necessary to cut a few grooves in the collar to ascertain the soundness of the weld. Any defects can be immediately discovered in this simple manner. It is not necessary to test a Thermit weld to destruction or wait for it to break in order to know whether the weld is good or not. The operator knows this immediately after the weld is finished because the Thermit weld being made all in one operation is uniform throughout. The dimensions of the weld, the quantity of Thermit and all other details are covered by printed instructions, thus insuring thorough fusion. Nothing is left to chance. The process is primarily adapted to the following applications:

In Railroad Shops: Locomotive frames, wheel centers, crossheads, guide yokes, cylinder saddles and tender frames. In short all heavy parts of the locomotive and many smaller parts.

In Steel Mills: Broken heavy equipment of all kinds, also for building up worn wobbler ends of rolls and pinions. For this purpose we have perfected a new mixture called "Wobbler Thermit." It produces a steel of the exact characteristics desired. Parts built up with Wobbler Thermit outwear the original metal.

In Ship Yards: Broken stern frames, rudder frames and stocks, shafts of all kinds.

In Railway Tracks: Welding rail joints, compromise joints, making special work and repairing broken mates, switches and frogs.

Thermit welding is now the accepted method of making rails continuous and eliminating rail joints in paved streets.

There are many other applications too numerous to mention here. Let us tell you about them. Full information sent on request.

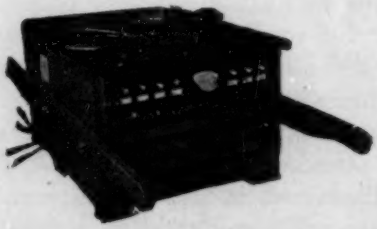
METAL & THERMIT CORPORATION

120 Broadway, New York

Pittsburgh Chicago Boston S. San Francisco Toronto

ELECTRIC ARC WELDING

for Superior Work
at Low Cost



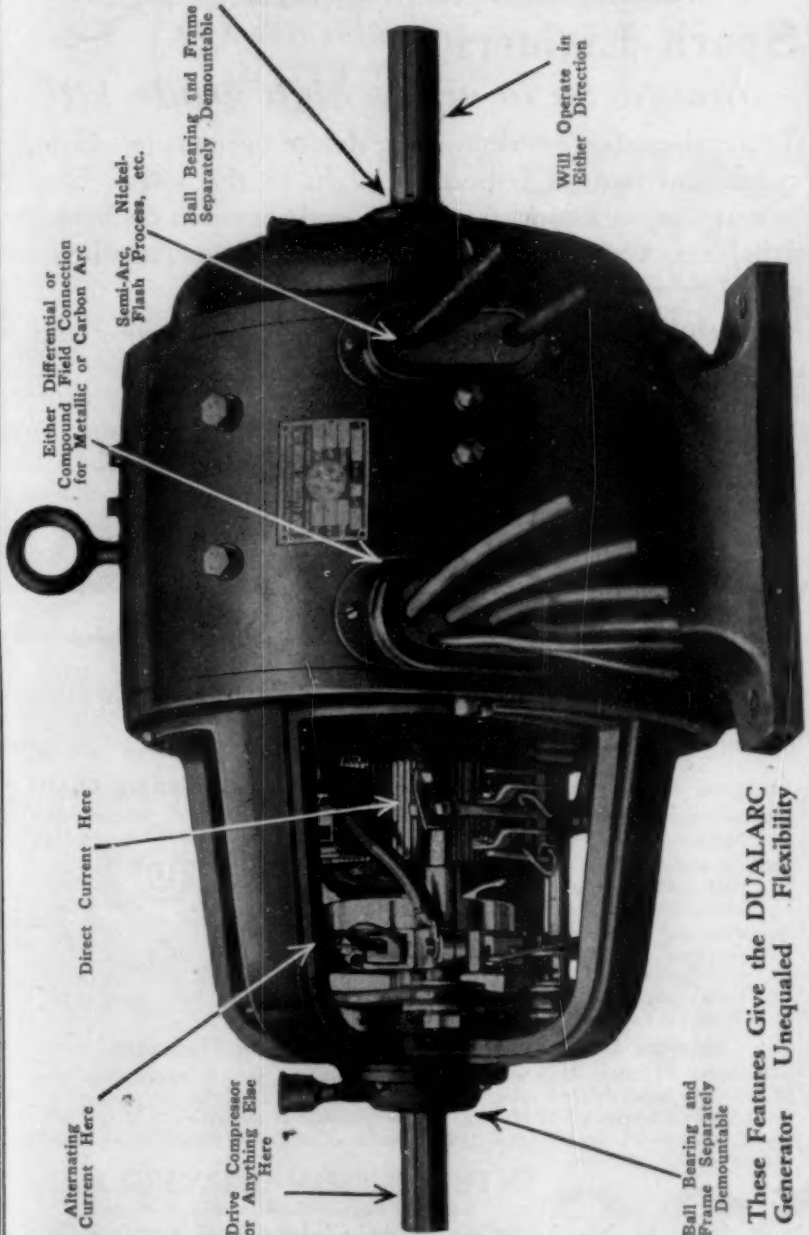
One arc, two arc or four arc transformer welder can be used combined for cutting.

ALTERNATING CURRENT IS NO GOOD FOR WELDING certain special developments such as brass, Everdur and low zinc bronzes. Direct Current is better on these new developments but on iron and steel A.C. is at least equal to D.C. and faster in operation and cheaper in cost. On Chrome steel and Stainless steels A.C. is smoother and better than D.C. and the special Semi-Arc process is done only with A.C. Our DUALARC generator delivers both A.C. and D.C. for all arc welding, besides having reversible series field for the 20 volt metallic arc and 40 volt carbon arc, together with other exclusive advantages as pictured. This compound field arrangement is very handy where a long distance has to be covered and we guarantee one mile using 2/0 wire without affecting the regulation of the machine. The compound arrangement is also very handy where great penetration is desired, such as for overhead welding, or welding in a shallow corner or Vee.

Our ALTERNARC transformers are faster and cheaper for steel and iron welding and we have been quite successful in the structural field recently developing. May we have consideration for your requirements?

Electric Arc Cutting and Welding Co. 152 Jelliff Ave., Newark, N. J.

We Have It!—A Generator for BOTH A.C. and D.C. Welding


Ball Bearing and Frame Separately Demountable
Will Operate in Either Direction
Semi-Arc, Nickel-Flash Process, etc.
Either Differential or Compound Field Connection for Metallic or Carbon Arc
Direct Current Here
Alternating Current Here
Drive Compressor or Anything Else Here
Ball Bearing and Frame Separately Demountable

These Features Give the DUALARC Generator Unequaled Flexibility

Electric Arc Cutting and Welding Co.

152 Jelliff Ave., Newark, N. J.

The Rolls-Royce of Spark Lighters

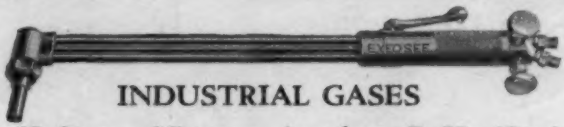
Should be in every high grade kit

Truly, the safest spark lighting device ever made. Sure, quick and handy. Shoots straight to the spot. Easy to carry in pocket or on belt. Does not catch on hooks, nails, etc. Can be held far enough away to avoid all danger of burning hands when lighting torch.

Masterful in mechanism and construction. Strong and durable. The tool of the expert welder.

DON'T STRIKE A MATCH
SHOOT-A-LITE

STEVENSON DISTRIBUTING CORPORATION
(Sole Owner)
119-121 E. 27th St., New York



INDUSTRIAL GASES

Oxygen, Hydrogen, Nitrogen, Acetylene C. H. (Cutting Gas)

Engineering Service: Installation of Complete Plants: I. O. C. Electrolytic System.

Cutting and Welding Equipment: EYEOSEE and INTERNATIONAL cutting and welding torches, regulators, acetylene generators. The best built, most efficient and economical line made.

Supplies and Accessories: I. O. C. stud valves, patented packingless high-pressure valve, safe and easily operated. Complete line of supplies for Gas Plants and Welding Shops—oxygen testing sets, charging lines, goggles, asbestos gloves and mats, welding rods and wire. *Write for Literature.*

Knowles Electrolytic Plants for Producing Hydrogen

Knowles Patented Cells are safe, simple, easy to install, automatic, low in first cost and maintenance, and in addition to flexibility of operation have the advantage of producing also a quantity of pure OXYGEN equal to 50 per cent of the HYDROGEN volume. Can be furnished in any size up to 15000 amperes.

I.O.C. SYSTEM
INDUSTRIAL GASES

INTERNATIONAL OXYGEN CO.
American Pioneer Manufacturers of Oxygen
Selling Agents: International Acetylene Co. Newark, N. J.
Plants at Newark, N. J.; Verona, Pa.; Toledo, Ohio
Offices at New York and London, Eng.

CUT OFF ALONG THIS LINE

MEMBERSHIP APPLICATION BLANK

AMERICAN WELDING SOCIETY

33 WEST THIRTY-NINTH STREET
NEW YORK, N. Y.

.....192..

Secretary:

I hereby apply for Class.....Membership in the

.....Section of the AMERICAN

WELDING SOCIETY and attach hereto remittance of $..... for first annual dues. Remittance will be refunded in the event of rejection of applicant. I also agree to abide by the Constitution and By-Laws of the Society and By-Laws of the Section.

Name .....

Present occupation .....

Name of Company and Address .....

Residence .....

Address for mailing .....

.....

.....

.....

.....

.....

Applicant is requested to state here length of welding experience and processes involved, also to record any technical or mechanical experience.

References: (1. .....

Applicants to classes C and D should reserve this space for employer's signature

(at least two) (2. .....

Proposed by .....

(See other side)

CUT OUT ALONG THIS LINE

QUALIFICATIONS FOR MEMBERSHIP

Extract from By-Laws

ARTICLE I.

Section 1. Individuals having received the approval of a majority of the Membership Committee shall become members of this Society upon the payment of dues, except in the cases of honorary members who shall be elected by unanimous vote of the full Board of Directors.

Section 2. Membership shall be divided into five classes:

Class A. Sustaining members, being individuals or individuals delegated by corporations, firms, partnerships, etc., interested in the science and art of welding, with full rights of membership.

Annual dues..... $100.00

Class B Members, being individuals interested in the science and art of welding, with full rights of membership. Engineers or individuals competent by experience or training to plan or direct welding operations are eligible to this class.

Annual dues..... $20.00

Class C Associate members with right to vote but not to hold office, except in Sections as may be provided for by the By-Laws of the Section. Supervising welders, inspectors and skilled operators, with three or more years' practical experience in welding, are also eligible to this class.

Annual dues..... $10.00

Class D Operating members, who are welders or cutters by occupation, without the right to vote or hold office except in Sections as may be provided for by the By-Laws of the Sections.

Annual dues, United States and Canada $5.00
Other countries..... $10.00

Class F Student Members, who are actually in attendance at any one of the recognized colleges and approved trade schools, without the right to vote or to hold office except in sections as may be provided for by the By-Laws of the Section.

Annual dues..... $2.50

Variable Voltage Arc Welder on Portable Truck

Burke Arc Welder

All adjustment of current for various classes of work and different sizes of electrodes is accomplished by merely turning a hand wheel which moves the brushes.

Range of adjustment 50 to 300 amperes through an infinite number of steps.

Send for Bulletin No. 133

BURKE ELECTRIC COMPANY

ERIE, PA.

Service Sales Offices:

NEW YORK CHICAGO PHILADELPHIA PITTSBURGH
CLEVELAND DETROIT BUFFALO

Sales Agencies:

CINCINNATI — UNDERWOOD ELEC. CO.
KANSAS CITY — W. T. OSBORN
MILWAUKEE — FRED H. DORNER
TULSA — COST CUTTING CO.
AKRON — BERTHOLD ELECTRIC & ENG'G. CO.
BOSTON — C. A. COTTON
INDIANAPOLIS — W. A. FLETCHER CO.

You are assured of High Purity Oxygen for Metal Cutting by using Airco Oxygen

Every Airco Oxygen Cylinder
is tagged with the above seal
and bears this stamp—

AIR REDUCTION SALES COMPANY

Home Office, 342 Madison Ave., New York City

Manufacturers of

Airco Oxygen—Airco Acetylene—Airco Calorene—Airco Nitrogen
Airco Neon—Airco Argon—Airco-National-Carbide
Airco-Davis-Bournonville Welding and Cutting Apparatus and Supplies

BIRMINGHAM	CLEVELAND	LOS ANGELES	PHILADELPHIA
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			SEATTLE